Presidential Address
ON
PREVENTIVE MEDICINE.

Delivered in the Section of Preventive Medicine at the International Congress of Hygiene and Demography.

BY SIR JOSEPH FAYRER, K.C.S.I., M.D., F.R.S.

GENTLEMEN,—My first duty on occupying this seat is to make fitting acknowledgment of the honour which has been conferred on me, and to assure those to whom I am indebted for it that, as I appreciate the distinction highly, so, with the aid of my colleagues in this Section and the support of the many eminent men of science who will take part in its work, I hope to discharge faithfully the important trust reposed in me. My next and most agreeable duty is to offer to all who honour us with their presence, or who propose by coöperation to forward the objects of the Congress, a most hearty welcome and cordial recognition of the interest in it manifested by their presence; to express a hope that the deliberations and conclusions which result from their wisdom and experience may advance our knowledge, and tend to enhance the welfare of the human race. This hope is based upon the universal recognition of the need of, and capacity for, improvement in the conditions upon which physical well-being, immunity from disease, and prolongation of life depend; and this is evinced by the assembling together in this Congress of men of science from all parts of the world, who have devoted themselves to the great international, humanitarian purpose of ameliorating the conditions of mankind everywhere, so far at least as the application of the laws of health, and to some extent those of sociology, can affect this consummation. To all, then, we in this great city, who are interested in the progress of hygiene and demography, offer our cordial greeting, and express an earnest desire that our visitors may derive pleasure and benefit from their sojourn in London, and from the proceedings of the great assembly of which they form so important a part.

Before I invite Dr. Cuningham to open the first subject for discussion it is right that I should make a few preliminary remarks on the general scope and objects of the work comprised in this Section. I do not intend to occupy much of the short and valuable time at our disposal by discussing any special subject, or by anticipating that which those who follow me may have to say, but shall confine myself to a brief notice of the present aspects of preventive medicine, its recent development, how much it has operated and is now operating for the public good, how slowly but surely it is dispelling the cloud of ignorance and prejudice which has overshadowed and impeded the progress of sanitation, and how it is gradually imbuing the public mind with the conviction that prevention is better and often easier than cure, that health may be preserved, disease avoided, and life prolonged by the study and observance of certain well-known laws, which, correlating the individual with his surroundings, determine his well-being when conformed to, deteriorate or prevent it when neglected, and should enforce the maxim, "Venienti occurite morbo." Unprecedented progress in human knowledge characterises the present century, and has not been wanting in preventive medicine. It is, however, during the last half of it that advance has been most remarkable, whilst it is in a later part of that period that it has so established itself in the popular mind as to have passed from the region of doubt and speculation into that of certainty. It is now pretty generally understood that about one-fourth of all the mortality in England is caused by preventable disease, that the death-rate of large communities may be reduced much below that at which it has been wont to stand, the average duration of life may be made to approximate nearer to the allotted fourscore, and that the conditions of living may be greatly ameliorated. The chief obstacles to improvement have been ignorance and want of belief; a better knowledge of the laws of life and health, a more rational comprehension of the nature and causes of disease, are gradually but surely entailing improvement in the conditions of living and in the value of life, and the diminution and mitigation, if not extinction, of morbid conditions which have in past times proved so injurious or destructive to life. In short, as Dante says:

> "Se' l mondo laggiù ponesse mente
> Al fondamento che natura pone,
> Seguendo lui avria buona la gente."
> Paradiso, viii., 142.

Such are the subjects contemplated in the work of this Section, and as far as time permits the most interesting of them will be discussed. Those selected are of great importance in their relations to public health; let us hope that observers who have formed their opinions from experience in other countries and under different circumstances may throw new light on them.

In the brief space of time at my disposal it would be impossible to give a continuous outline of the progress of preventive medicine during the past, or to trace its growth and development out of ignorance and superstition to its present well-established foundation on a scientific basis. It is of happy augury for mankind that the subject of public health is now fairly grasped by popular sentiment, and that, though ignorance, opposition, and vested interests still contest the ground, progress is sure, and the light of science is illuminating the dark places. It is now better appreciated than it ever has been, that the causes which induce disease and shorten life are greatly under our own control, and that we have it in our power to restrain and diminish them, and to remove that which has been called "the self-imposed curse of dying before the prime of life." It is, indeed, only recently that the resources of medical science have been specially devoted to the prevention as distinguished from the cure of disease, and how far successfully I hope in a few words to show, whilst I trust the proceedings of the various Sections of this Congress will indicate how much remains to be done. Did time permit, I might illustrate the progress of preventive medicine by contrasting the state of England with its population of more than 29,000,000 during the Victorian with the England of the Elizabethan age with its 4,000,000. I might remind you of the frightful epidemics which had devastated the land in the forms of black death, sweating sickness, plague, petechial typhus, eruptive fevers, smallpox, influenza, and other diseases, such as leprosy, scurvy, malarial fever, dysentery, &c., of the wretched mode of living, bad and insufficient food, filthy dwellings, and ill-built towns and villages, with a country uncultivated and covered with marshes and stagnant water (according to Defoe one-fifteenth part of England consisted of standing lakes, stagnant water and moist places, the land unreclaimed, and with the chill damp of marsh fever pervading all). The homes of the people were wooden or mud houses, small and dirty, without drainage or ventilation, the floors of earth covered with straw or rushes, which remained saturated with filth and emitting noxious miasmata. The streets were narrow and unpaved, with no drains but stagnant gutters and open cesspools, while the food was principally salted meat with little or no vegetable. To this may be added a large amount of intemperance and debauchery. As it is, I can only just allude to them. In such conditions disease found a congenial nidus, and by a process of evolution assumed the various epidemic forms which proved so destructive to life. Some of these have gone, let us hope never to return, and the conditions which fostered if they did not cause them have gone also. Can we venture to hope that it will be the same with those that remain? Our immunity during the last diffusion of cholera gives some ground for thinking it may be so, if, indeed, the Legislature and popular intelligence should be of accord on the subject.

If we turn to the present, we find that great improvements have gradually been made in the mode of living; the houses are better constructed, the drainage and ventilation are more complete, the land is better cultivated, and the subsoil better drained; marsh fever and dysentery, at one period so rife, are unknown, and leprosy has long since disappeared. The death-rate is considerably reduced, and the expectancy of life enhanced. Water is purer, food is more varied and nutritious, clothing is better adapted to the climate, the noxious character of many occupations has been mitigated, and the mental, moral, and physical aspects of the people altogether improved; education is general, a better form of government prevails, and the social conditions are far in advance of what they have been; but still the state of our cities shows that improvement is demanded, and one object of this Congress is to point out why and how

this may be effected, not only in this country, but throughout the world.

If we inquire into the effects of certain well-known diseases, we find that they are less severe in their incidence, if not less frequent in their recurrence. With regard to small-pox, since the passing of the first Vaccination Act in 1840, the death-rate has diminished from 57·2 to 6·5 per 100,000 for 1880–84, though for the five years 1870–74 it was 42·7, thus showing that there was still much to be learnt about vaccination. Enteric fever was not separated from typhus fever before 1869, but since then the death-rate has decreased from 0·39 to 0·17 per 1000, and it has been shown that this improvement was synchronous in different parts of England with the construction of proper drains. The diminution in the death-rate from typhus fever is quite as striking, and this also is shown to have run parallel with improved sanitation in more than one large town. The death-rate from scarlatina fluctuated between 97 and 72 per 100,000 between the years 1851 and 1880, and though it has diminished considerably of late years (17 per 100,000 in 1886), a corresponding increase in the death-rate from diphtheria has taken place; this may be due in part to a better differentiation of the two diseases. In 1858 it was reported that phthisis killed annually more than 50,000 people; the death-rate from this disease has not decreased very much for England and Wales, but it has done so in some large towns, notably in Liverpool, and Dr. Buchanan and Dr. Bowditch of Massachusetts both showed a striking parallelism between the diminution of the death-rate from this cause and the drying of the soil resulting from the construction of sewerage works. Cholera first appeared in England in 1831, and there were epidemics of it in 1848–49, 1853–54, and 1865–66, but the number of deaths diminished each time it appeared, and though it has been present since, it has never reached the height of an epidemic. This is fairly attributable to local sanitary rather than to coercive measures. Preventable disease still kills yearly about 125,000, and, considering the large number of cases for every death, it has been calculated that 78½ millions of days of labour are lost annually, which means £7,750,000 per annum; this does not include the days lost by the exhaustion so often induced by the still too numerous unhealthy houses of the poor. Towns, villages, and houses are still built in an insanitary way; the death-rate is still higher and the expectancy of life lower than it should be, and though we have got rid of the terrible plagues of the middle ages, yet in this century, now closing, other epidemics have made their appearance: cholera has four times visited us; fevers, eruptive diseases, and diphtheria have prevailed; influenza has appeared several times, even recently, and after leaving us last year, only to return with renewed virulence, caused in the United States a mortality almost equal to that of the plague. Much has been done, and a great deal of it in what is called the pre-sanitary age, but much remains to be effected. Let us hope that the future may be more prolific of improvement than the past; international philanthropy seems to say it shall be so. That we can exterminate zymotic disease altogether is not to be expected, but there cannot be a doubt that we may diminish its incidence, and though we may never be able to reach the "fons et origo mali," yet we can make the soil upon which its seed is sown so inhospitable as to render it sterile. The scope and objects of preventive medicine are not limited to the removing of conditions which give rise to zymotic disease, nor even of those which compromise otherwise the physical welfare of mankind, but should extend as well to a consideration of the best means of controlling or obviating those which, attending the strain and struggle for existence, involve over-competition in various occupations, whether political, professional, or mercantile, by which wealth or fame is acquired or even a bare livelihood is obtained, and under the pressure of which so many succumb, if not from complete mental alienation, from breakdown and exhaustion of the nervous system, which give rise to many forms of neurotic disease and add largely to the numbers of those laid aside and rendered unfitted to take their due share in the natural and inevitable struggle for existence. Or I might point to the recrudescence of those psychical phenomena manifested by the so-called hypnotism or Braidism, morbid conditions arising out of the influence of one mind upon another; this is a subject which demands not only further investigation, but great precaution as to its application, and claims the watchful notice of preventive medicine on account of the dangerous consequences which may ensue from it.

Again, the abuse of alcohol, opium, chloral, and other stimulants and narcotics, and the evil consequences which may result therefrom, is also a subject worthy of consideration, and will no doubt receive it in a communication which is to be brought before this Section.

The possible deleterious influence of mistaken notions of education, as evinced in the over-pressure which is exercised upon the young, the predominance of examinations, their increasing multiplication and severity, and the encouragement of the idea that they are the best test of knowledge, whilst true mental culture is in danger of being neglected, and physical training, if not ignored, left so much to individual inclination,—this is another subject which demands the jealous scrutiny of preventive medicine, whose duty it is to safeguard the human race from all avoidable causes of either physical or mental disease.

Though preventive medicine in some form has been practised since the days of Moses, yet it has received but little recognition until a comparatively recent period; when science developed and observation extended, medical men and others became impressed with the influence of certain conditions in producing disease, and thus it was forced upon the public conscience that something must be done; and when philanthropists like John Howard devoted life and property to the amelioration of such awful conditions as existed—e.g., in our gaols, where the prisoners not only died of putrid fever, the result of ochletic causes, but actually infected the judges before whom they came reeking with the contagion of the prisons—rude sanitary measures gradually came into operation and partially obviated these evil conditions, but it was not before the middle of this century that any scientific progress was made; it was when Chadwick, Parkes, and others initiated the work by which they have earned the lasting gratitude of the human race that preventive medicine became a distinct branch of medical science. The sanitary condition of towns and communities is not dependent on the views or exertions of individuals alone, for they are and have been for the last fifty years largely cared for by the Legislature, and a variety of Acts have been passed which deal with questions concerning the public health; indeed, were all the provisions enforced, little would remain to be desired on the part of the executive Government, but as many of them are permissive, not compulsory, the benefit is less complete than it might be. The old difficulty of prejudice combined with ignorance still too often stands in the way, and, despite evidence which on any other subject would be conclusive, the most obvious sanitary requirements are often ignored or neglected. Many thousands of lives have been saved by the Sanitary Acts now in force; but there is little doubt that more thorough organisation under State control, as under a Minister of Public Health, would have most beneficial results, and would save a great many more. We must acknowledge, however, that we are much indebted to the action of the Local Government Board, under whose able administration the most crying evils are gradually being rectified. Through the wise precautions enacted by it against the importation and diffusion of epidemic disease, when other parts of Europe were affected by cholera, this country escaped, or so nearly so as to suggest that it was to sanitary measures we owed our immunity. That there is something in the nature of epidemics which brings them under the dominion of a common law as to their extension seems certain; that there is much about them we do not yet grasp is equally true, but it is as surely the case that local sanitation is the preventive remedy as it is that coercive measures to arrest their progress are unavailing.

Under the improved system of sanitary administration which now obtains, and is gradually developing to a greater state of perfection, the sanitary administration of every district in the country is entrusted to the care of duly qualified health officers—a system from which excellent results have already accrued, and from which better still may be anticipated. The records of the past fifty years prove the influence exerted by sanitary measures on vital statistics. The first reliable tables from which the expectancy of life may be derived show that in 1838 to 1854 it was for males 39·91 years, for females 41·85 years; by the tables of 1871 to 1880 it had increased to 41·35 for males and 44·66 for females. It is shown also that the expectation of life increases every year up to the fourth year, and decreases after that age. For males up to nineteen years it is higher by the last tables, but after that age it is higher by the old table; for females it is greater by the new table up to forty-five, but after that age it is less. The improved sanitation saves more

children's lives, but the conditions of gaining a living are harder than they were at the time of the first table, which accounts for the expectancy of life for adult men being less. Women remain more at home, where the better sanitation tells, and are not subject to quite the same conditions as men, so that their expectancy of life is greater than by the old tables up to the age of forty-five. A further proof of the effects of sanitary work is a decreased death-rate. Let us compare the death-rates of England during past times with the present; whether they be equally significant for other countries I cannot say, but these, at all events, sufficiently prove the point in question.

DEATH-RATE.

1660–79	80 per 1000	1870–75	20·9 per 1000
1681–90	42·1 ,,	1875–80	20·0 ,,
1746–55	35·5 ,,	1880–85	19·3 ,,
1846–55	24·9 ,,	1885–88	18·7 ,,
1866–70	22·4 ,,	1889	17·85 ,,

In some parts of England, where the main object is the recovery or maintenance of health, the death-rate is down to 9 per 1000, while in others, where the main object is manufacture and money-making, it is as high as 30 per 1000. Nowhere, I think, have the beneficial results of sanitary work been better illustrated than in India during the past thirty years. A Royal Commission was appointed after the Crimean war to inquire into the sanitary condition of the British Army, and this in 1859 was extended to India. The European army was the special subject of it, but the native troops were referred to incidentally. Here the inquiry had to deal with a large body of men, concerning whom, their conditions of existence being well known, reliable information was accessible. It was ascertained that up to that time the annual death-rate over a long period had stood at 69 per 1000. The inquiry resulted in certain changes and improvements in the housing, clothing, food, and occupation of the soldier. Since these have been carried out there has been a steady decline in the death-rate, and the annual reports of the Sanitary Commissioners to the Government of India give the rates as: in 1886, 15·18 per 1000; 1887, 14·20 per 1000; 1888, 14·84 per 1000. During some years it has been even lower, down to 10 per 1000, whilst the general efficiency of the troops has increased. It is not easy to estimate the money equivalent of this, but if we take the rough standard which values each soldier at £100, a simple calculation will show how great is the gain, and who can estimate the value of lives saved and suffering avoided? As to native soldiers with whom the European troops may be compared, I find that the death-rate was: in 1886, 13·27 per 1000; 1887, 11·68 per 1000; 1888, 12·84 per 1000. Famine, cholera, and other epidemic visitations in some years disturb the regularity of the death-rate; under less favourable conditions of living, as in the case of prisoners in the gaols, it is somewhat higher. In the Indian gaols, for example, it was: in 1886, 31·85 per 1000; 1887, 34·15 per 1000; 1888, 35·57 per 1000.

On the whole, all this indicates improvement,[1] and as regards the civil population progress also is being made; but here, from so many disturbing causes, the figures are neither so easily obtained nor so reliable. The comparatively large mortality is due to neglect of the common sanitary laws added to extremes of climate, which favour the incidence and diffusion of epidemic disease, and intensify it when it has once appeared. A Sanitary Department has existed in India since 1866, and every effort is made by Government, at no small cost, to give effect to sanitary laws; there can be little doubt that the results so far are good, that disease generally is diminishing, and that life is of longer duration. An important result of the observations of the able medical officers of the Sanitary Service of India has been to show that cholera is to be prevented or diminished by sanitary proceedings alone, and that all coercive measures of quarantine or forcible isolation are futile and hurtful. Here I may say that, large as may appear the death-rate from cholera in India (i.e., in 1888, 1·99 per 1000 for the European army and 1·35 for the civil population), it is small compared with that of fevers, which caused in 1889 4·48 per 1000 in the European army and 17 09 in the civil population; but there is every reason to believe that these also are becoming less fatal under the influence of sanitary measures. In preventive as in curative medicine, knowledge of causation is essential. It is obvious that any rational system of proceeding must have this for its basis. A certain empirical knowledge may be useful as a guide, but no real advance can be expected without the exactitude which results from careful scientific observation and induction; the spirit of experimental research, however, is now dominant, and progress is inevitable. How much we owe to it is already well known, whilst under its guidance the reproach of uncertainty which attaches to medicine as a science is disappearing. Recent advances in physiology, chemistry, histology, and pharmacology have done much to throw light on the nature and causes of, and also on the means of preventing or of dealing with, disease. It is impossible to exaggerate the value of the scientific researches which have led to the antiseptic methods of preventing the morbific action of micro-organic life, whether the toxic effects produced by them, or those induced autogenetically in the individual. Theory has here been closely followed by its practical application in prevention and treatment of disease, whilst the study of bacteriology, which is of such remarkable pre-eminence at the present time, is opening out sources from which may flow results of incalculable importance in their bearing on life and health. That the conclusions arrived at are always to be depended on I doubt, and it seems that scientific zeal may perhaps sometimes outrun discretion. That it might be wiser to postpone generalisation has, I think, been more than once apparent, whilst the expediency of further investigation before arriving at conclusions which may subsequently prove to be erroneous should not be lost sight of; but it has probably ever been so in the course of scientific progress, that in the enthusiasm of research, which is rewarded by such brilliant results, early generalisation has too often been followed by disappointment, and it may be by temporary discouragement of hopes which seemed so promising.

It would be well to bear in mind a caution recently given by the Duke of Argyll, "that we should be awake to the retarding effect of a superstitious dependence on the authority of great men, and to the constant liability of even the greatest observers to found fallacious generalisations on a few selected facts."[2] Still, it is in the region of scientific research by experiment that we look for real progress, and we can only deplore the mistaken sentiment, the false estimate, and the misconstruction of its aspirations and purposes, which have placed an embargo on experiment on living animals, rendering the pursuit of knowledge in this direction wellnigh impossible, if not criminal; whilst for any other purpose, whether of food, clothing, ornament, or sport, a thousandfold the pain may be inflicted without question. The inconsistency of the sentiment which finds unwarrantable suffering in an operation performed on a rabbit, when the object is to preserve human or animal life or prevent suffering, but which raises no objection to the same animal being slowly tortured to death in a trap, or hunted or worried by a dog, needs no comment; whilst the spirit which withholds from the man of science what it readily concedes to the hunter is, to say the least, as much to be regretted as it is to be deprecated.

It must be remembered that, important as are the researches into microbiology, there are other factors to reckon with before we can hope to gain a knowledge of the ultimate causation of disease. It is not by any one path, however closely or carefully it may be followed, that we shall arrive at a full comprehension of all that is concerned in its etiology and prevention, for there are many conditions, dynamical and material, around and within us which have to be considered in their mutual relations and bearings before we can hope to do so; still, I believe we may feel satisfied that the causes of disease are now being more thoroughly sought out than they ever have been,—all honour to those who are prosecuting the research so vigorously,—and that though individual predilection may seem sometimes to dwell too exclusively on specific objects, yet the tendency is to investigate everything that bears upon the subject, and to emphasise all that is implied in the aphorism, *Salus populi, suprema lex.*

[1] "It is to be noticed with regret that during the last five years there has been a tendency to revert to a higher death-rate and percentage of sickness. Let us hope this will prove only transitory; the attention of sanitary authorities both at home and in India is anxiously directed towards the removal of whatever may be the cause of it. It is shown both by the vital statistics and the history of the chief diseases that there is in India an enormous amount of preventable sickness and death," but "that the local insanitary conditions or local disease causes are well known and widespread."—A. S. C.'s Reports for 1889.

[2] Nineteenth Century, April, 1891.

Presidential Address
ON
RECENT PROGRESS IN SANITARY LEGISLATION.

Delivered in the Section of Engineering in Relation to Hygiene at the International Congress of Hygiene.

BY SIR JOHN COODE, K.C.M.G.,
PAST PRESIDENT OF THE INSTITUTION OF CIVIL ENGINEERS.

GENTLEMEN,—It is my first duty, and I esteem it at the same time to be my great privilege, to offer, as I now do, on behalf of the English members of the Engineering Section, a cordial welcome to those brethren of our profession who have come among us from afar in order to be present at this Seventh International Congress of Hygiene and Demography. It has been, I can assure you, the anxious desire of the organising committee to provide such papers as will contribute to the advancement of the knowledge of hygiene in all its branches. Of both the scope and the importance of the subject with which the Congress has taken upon itself to deal there cannot surely be two opinions. Having for its principal—or rather, it may be said, for its sole—aim and object, the preservation of health (or, in other words, the *prevention* rather than the *cure* of disease), the subject of hygiene may well occupy the attention and claim the interest of all who desire the welfare of the human race. As we, the British members, are well assured, it is because the object of this gathering is one which is in an especial degree calculated to benefit the community at large that it enjoys the patronage of our honoured and beloved Sovereign Queen Victoria, and that it is supported by the presidency of the Prince of Wales. By his presence at our opening meeting yesterday his Royal Highness has given personal proof that he feels a genuine interest in the success of the cause which we all have at heart.

It will not, it is to be hoped, be devoid of interest if I here offer a few remarks on the progress of modern legislation in this country in respect of sanitary matters. About the year 1838 the public mind of Great Britain became first aroused, so to speak, to the serious and growing evils arising from the absence of proper precautions for the preservation of the health of the dwellers in our large towns and cities generally, and more especially in this metropolis in which we are now assembled. Between 1838 and 1848 the question of public health in the United Kingdom was dealt with in the course of frequent debates and discussions in Parliament; it also formed the subject of inquiries by committees and commissions. At the end of that decade these investigations and discussions culminated in the establishment of an entirely new department, which was entitled the "General Board of Health"; ten years later on that body was superseded by an Act of the Legislature, under which the important department known as the "Local Government Board" was created. Many names might be mentioned in connexion with the work of the two decades just adverted to, but amongst them there stands out most prominently that of one man, the late Sir Edwin Chadwick, whose untiring zeal and well-directed labours contributed more than those of any other single individual to the success of this great movement, and to the adoption of those important measures which have conduced in so great a degree to the improvement of public health in this country. When speaking to a body of civil engineers, as I have now the honour of doing, it would be remiss to omit to mention the name of another gentleman, whom we have the privilege of including in our list of vice-presidents: I refer, of course, to Sir Robert Rawlinson; his eminent services, first in the organisation, and, secondly, in the direction for many years of the Engineering Department of the Local Government Board, have deservedly received the marked approval of the Sovereign. The importance of a correct knowledge of the laws of hygiene being granted, this importance becomes accentuated in every place where human beings are congregated together in considerable numbers, as in the case of large towns and cities, the greatest and most notable example of which is this mighty metropolis, this "city of immensity," as it has well been called. Is there not, therefore, a peculiar fitness in the holding of this Hygienic Congress in London, which contains the greatest congregation of human beings the world has ever seen? Permit me to mention a fact or two which may serve to give some of those whom I now address a more exact idea of the magnitude of this London of ours. The population of the metropolis is, in round figures, 5,660,000. The vastness of this number will perhaps be somewhat better realised by my stating the fact that it is considerably greater than the numbers of the inhabitants of the cities of Paris, of Berlin, of Vienna, and of Rome, all combined. As a matter which cannot fail to be of special interest to engineers, let us turn for a moment and see what has been done in the way of works that have been executed for the special purpose of improving the health of London. The main, intercepting, and principal branch sewers, which have been constructed for the conveyance of the sewage of London to the two outfalls into the river Thames, at Barking and Crossness respectively, measure about eighty English miles, equal to 130 kilometres. Since the year 1856, when the now extinct Metropolitan Board of Works was formed, there has been expended on the main drainage works alone the sum of nearly £6,000,000 (120,000,000 marks, or 150,000,000 francs).

As a by no means unimportant factor among the changes which in modern times have resulted in the better health of our capital city, a reference to the supply of water of improved quality and in larger quantity must not be altogether omitted. Up to the end of 1890 the several companies (eight in number) had expended upon works for the supply of water to London a sum very closely approximating to £15,000,000 (300,000,000 marks, or 375,000,000 francs). The average quantity of water delivered last year to the inhabitants of London, for domestic purposes alone, was 24·75 gallons per head of population per diem, and in point of quality but little, if at all, surpassed by that supplied to any other city in Europe. This water is conveyed through pipes, the united length of which is about 4760 miles. The total volume of water delivered for domestic purposes only in 1890 was 64,000,000,000 gallons (290,623,000 cubic metres). For raising this large quantity the companies employed no less than 184 steam pumping engines, having an aggregate of 21,659 horse-power. As another illustration of the magnitude of London, it may be mentioned that the streets and roads within the metropolis, if placed end to end in one continuous line, would measure about 2500 miles, equal to the distance from London to Land's End, and thence across the Atlantic Ocean to the mouth of the Gulf of St. Lawrence in Canada on the west, or, going eastward, would extend across the entire continent of Europe, and beyond the Ural Mountains into Asia. Whilst admitting that extensive drainage works have been executed, and that large expenditure has been incurred for improving the health of London, it cannot yet, by any means, be said that all has been done which might be done in this direction. Nor will it be possible to say as much as long as the sewage of the metropolis is allowed to flow into any part of the Thames without previous purification by the most perfect method as yet known—i.e., by being filtered through land. The only alternative would seem to be the conveyance of the sewage to the sea coast beyond the mouth of the estuary of the Thames. Nevertheless, and notwithstanding the room which exists for further improvement in the disposal of its sewage, the reduction which has been brought about in the death-rate of London in modern times is as noteworthy as it is satisfactory. A few facts will show the benefits that have accrued from the better understanding and the more effectual application of the laws of hygiene in our metropolis. In the latter half of the seventeenth century the average mortality of London is said to have been not less than 80 per 1000; at the end of the eighteenth century it had dropped to 50 per 1000; in the decade ending in 1850 it was 25 per 1000; in that ending in 1870 it was 24 per 1000; whilst in that ending in 1890 it had further fallen to 19·8 per 1000. It is gratifying to note that for the year 1889, taken *per se*, the rate was as low as 17·4 per 1000, and there is no reason for supposing that it would not have been equally low for the year 1890 had it not been for the unfortunate epidemic which then prevailed, in consequence of which it rose in 1890 to the same proportion as that at which it stood in the early part of the last decade—viz., 20·3 per 1000. In the opening part of this address it was stated that it had been the anxious desire of the Organising Committee to provide on this occasion such

papers as would contribute to a further knowledge of the subject of hygiene; I will now only add, in conclusion, that, as far as regards our own particular Section, we, speaking on behalf of the Engineering Committee, have in this respect endeavoured to fulfil our part, and have also made arrangements for your inspection of works of professional interest from a hygienic point of view.

We trust that the papers to be read and discussed, and the visits which have been organised, will prove to be not altogether uninstructive, and that they will result, in some degree at least, in furthering the aim and object of this International Congress—i.e., the advancement and diffusion of sound and useful knowledge relating to the all-important subject of sanitary science.

ON IMMUNITY.[1]

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SINCE Pasteur's celebrated discovery that it is possible to make animals immune against chicken cholera and other diseases by the use of attenuated vaccine, the nature of immunity, whether natural or acquired, has attracted to an ever-increasing extent the attention of bacteriologists. Year by year new theories have been brought forward to explain these phenomena. It is not my intention to attempt to discuss these earlier theories, partly because I prefer to leave this to abler hands, partly because the more recent theories on this subject tend rather to supplement than to exclude their predecessors. I should like, however, to point out how our modern views on this subject are acquiring greater precision and definiteness as time goes on. The view that acquired immunity was due to an alteration of the metabolism of the tissue cells, either in general or at the seat of infection (Grawitz, Buchner), is now known as the phagocite theory, with which the name of Metschnikoff will ever be honourably connected. The supposition of Chauveau and others that immunity was caused by the presence of some unknown substance of bacterial origin is now overshadowed by the results obtained by many workers who have actually found bacteria-killing substances in immune animals, whose nature and origin, however, appear to be very different from what Chauveau's theory might have led us to expect. It is to a consideration of this view of the nature of immunity that I propose chiefly to devote my paper.

Towards the end of 1888 Nuttall discovered that various bacteria are destroyed when mixed with fresh blood or blood serum, and, further, that this destruction cannot be ascribed to the action of cellular elements, but rather to the fluid part of the blood. This discovery (which really arose from the German criticism of Metschnikoff's phagocyte theory) was soon followed by the work of Buchner and Nissen, and these observers came to the conclusion that this bactericidal action of the cell-free blood serum is a weighty factor in the conflict between the organism and the microbe. A further confirmation of this view is to be found in the interesting discoveries of Bouchard. He first showed that the blood serum of an ordinary rabbit will serve as a culture medium for the bacillus pyocyaneus. If, however, a rabbit is made immune against the disease produced by this bacillus, its blood serum has acquired the power of attenuating and even destroying the microbe in question. Thus it was shown that by making an animal immune against a disease the bactericidal action of its blood serum was greatly increased. Similar results have since been obtained with the microbes of cholera, anthrax, and other diseases. Among these must be mentioned the recently published work of Emmerich and Mastbaum on pig typhoid. Not only have these observers found that the microbes of this disease are killed by the blood serum of rabbits that have been rendered immune against it, but they have successfully employed such serum to cure the disease after it has appeared in other susceptible animals. These discoveries concerning the bactericidal action of blood serum led to another of a very different, and I may say unexpected, nature. I refer to the work of Behring and Kitasato on tetanus and diphtheria which appeared at the end of last year. With these last-named diseases our attention is at once drawn from the microbes to the poisons they produce. The microbes of tetanus and diphtheria do not spread through the body of the infected animal, as is the case with anthrax. On the contrary, they remain in the immediate neighbourhood of the seat of inoculation. There they elaborate their deadly poisons, which, when absorbed into the system, produce, as is well known, various disastrous effects. For instance, an inoculated guinea-pig will in some cases develop typical diphtherial paralysis long after the last diphtheria bacillus has vanished from its system, and practically the same clinical effects can be produced by an injection of a minute dose of the poison made by the diphtheria microbe as by the microbe itself. Fraenkel, Behring, and other observers agree that scarcely any tolerance can be obtained by successive inoculations of minute doses of the unaltered diphtheria poison; consequently such a procedure can scarcely be expected to lead to a sure way of producing immunity against this disease. How then, it may be asked, can we ever hope to find a cure for diphtheria? Suppose, for example, a substance was discovered which could kill the diphtheria microbe without harming the living animal tissues, how could this cure disease when it has once appeared? The blood serum of rats possibly contains such a substance; but what could be the use of using it to destroy diphtheria bacilli in a patient if it leaves untouched the diphtheria poison, which, in the absence of the microbes that produced it, is quite capable of destroying the health of the patient?

The above-mentioned work of Behring and Kitasato disposed of the pertinency of these questions. These bacteriologists succeeded in making rabbits immune against tetanus and diphtheria. They found that the serum of a diphtheria-immune rabbit (to confine our attention to one of these diseases) exerts no bactericidal action on the diphtheria bacillus. It possesses, however, the remarkable power of destroying the poison produced by this microbe. In this anti-toxic power of such serum we at once see a possibility of curing tetanus and diphtheria (for the above statements hold good for both diseases), and, as a matter of fact, it has been found possible to cure either disease in mice and guinea-pigs. Indeed, Behring has cured mice of tetanus in which the disease had so far progressed that several of the limbs were in a condition of spasm. Gamaleia has obtained results with the poison of the vibrio Metschnikovi which go to confirm these of Behring and Kitasato. He found that this poison is destroyed by the blood serum of the rabbit, but not by that of the guinea-pig, these animals being by nature respectively refractory and susceptible to the attacks of this microbe. Thus we see that the discovery of the bacteria-killing power of blood serum, besides suggesting a new direction in which practical results may be expected, leads us to a new theory of immunity, which may be stated as follows:—"Immunity, whether natural or acquired, is due to the presence of substances which are formed by the metabolism of the animals rather than by that of the microbe, and which have the power of destroying either the microbe, against which immunity is possessed, or the products on which their pathogenic action depends." It may be noted that this theory, as I have stated it, does not attempt to exclude other factors. It is possible—or, indeed, probable—that in some animals immunity against some diseases depends either wholly or in part on other causes.

The question now arises, What is the nature of the substances on which this bactericidal action of blood serum depends? Buchner attempted an answer to this question two years ago when he first attacked the subject. He carefully tested the action of each one of the known constituents of blood serum on bacteria. Not one of them showed the slightest bactericidal action. He successively showed that the bacteria-killing action of blood serum could not be ascribed to salts present, to traces of fibrin factors, or to the other proteids of serum. Consequently he arrived at the somewhat curious conclusion that this power of destroying microbes possessed by blood serum was due to a remnant of the "vitality" that had been possessed by the blood-plasma from which the serum was derived. It is difficult to see in what sense of the word such a statement is an explanation of the bacteria-killing power of blood serum, and when I first read it I was at once reminded of Professor Huxley's comparison of "vitality" with the idea of Martinus Scriblerus, who explained the operation of the

[1] Paper read in the Bacteriological Section of the International Congress of Hygiene.

meat-jack by its inherent meat-roasting power, and scorned the materialism of those who sought to explain its action by some hidden mechanism in the chimney. Another possibility existed—namely, that Buchner had overlooked some constituent of blood serum, and that to this unknown constituent the bacteria-killing power of blood serum was due. It would lead me too far to attempt to detail the theoretical considerations that led me to suspect that a particular ferment-like proteid known as cell globulin *B* was the substance in question. At any rate, I tested its action on anthrax bacilli, and found that it possesses the power of destroying these microbes. I further found that similar substances were present not only in animals that are naturally immune against anthrax, but also in those that are susceptible to this disease. To those substances I have given the name of *defensive proteids*. In my published papers on this subject I have noted various similarities in the bactericidal action of these substances and that possessed by blood serum, and these resemblances are such as to leave little room for doubt that the bactericidal action of blood serum is due to the presence of these defensive proteids.

It is obvious that the mere presence of these bodies in the animal organism does not compel us to regard them as a means of resistance to microbe invasion. Before we can regard them as a real factor in the production of immunity it must be shown that the defensive proteid of a refractory animal is more active or is present in a larger quantity than is the case with an animal that is susceptible to a given disease. This very necessary proof I sought to obtain by a study of the defensive proteid of the rat. This animal is known to be highly resistant to anthrax. Behring, in 1888, showed that its serum is more alkaline than that of any other animal that he examined; further, that it has the power of killing anthrax bacilli, which power is lost when the serum is neutralised. He came to the conclusion that the immunity of the rat to anthrax is due to this high alkalinity of its serum, but was unable to isolate the alkaline substance involved. Naturally, my work on defensive proteids enabled me to attack this question from a more favourable standpoint, and I soon found that this serum contained a proteid body possessing a well-marked alkaline reaction and a power of destroying anthrax bacilli. Further, when injected into mice, along with fully virulent anthrax spores, it would prevent the development of the disease. On the other hand, defensive proteids of animals susceptible to anthrax can exert no such protective power, and consequently these experiments indicate a difference in the mode of action of defensive proteids from immune and susceptible animals respectively. Further, the amount of defensive proteid present in a rat can be diminished by those causes which are known to be capable of lowering its power of resisting anthrax. For instance, Feser states that rats become susceptible to anthrax when fed on a vegetarian diet. I have obtained similar results with wild rats. The ordinary white rat, however, I have found to be generally refractory to anthrax on any diet, and always the defensive proteid can be obtained from its spleen and blood serum. With the wild rat this is not the case. In one experiment eight wild rats were used; of these, four were fed on bread and meat, the others on plain bread, for about six weeks. Then one rat of each lot was inoculated with anthrax; of these, the one that had been subjected to a bread diet succumbed. The remaining rats were killed, and it was found that while the spleens of the flesh-fed rats contained abundance of the defensive proteid, only traces of this substance could be obtained from the spleens of the rats that had been fed on bread alone. A similar result was obtained in other experiments.

These facts appear to me to prove that the defensive proteid of the rat deserves its name, in that it tends to preserve it from the attack of the anthrax microbe; in other words, that this substance is, at any rate, a part cause of its immunity against anthrax.

Since the publication of my work on defensive proteids, Buchner has abandoned his view that the bacteria-killing power of blood serum is due to a remnant of vitality, and in a paper recently published he admits the importance of defensive proteids, and suggests for them the name "alexine." Certainly, if it were necessary to rechristen "defensive proteids," this name would be very appropriate. It would, however, be convenient to form names for the different classes of defensive proteids, and I do not think it would be premature to do so now. Defensive proteids appear to be ferment-like, albuminous bodies, and it is extremely unlikely that we shall for a considerable time be able to classify them by any other than physiological tests. From this point of view it is possible to divide them into two classes: first, those occurring naturally in normal animals, and, secondly, those occurring in animals that have artificially been made immune. For these two classes I propose the names of "sozins"[2] and "phylaxins."[2] A "sozin" is a defensive proteid that occurs naturally in a normal animal. They have been found in all animals yet examined, and appear to act on numerous kinds of microbes or on their products. A "phylaxin" is a defensive proteid which is only found in an animal that has been artificially made immune against a disease, and which, so far as is yet known, only acts on one kind of microbe or on its products. Each of these classes of defensive proteids can obviously be further subdivided into those that act on the microbe itself and those that act on the poisons it generates. These subclasses I propose to denote by adding the prefixes "myco-" and "toxo-" to the class name. Thus, myco-sozins are defensive proteids occurring in the normal animal, which have the power of acting on various species of microbe. Toxo-sozins are defensive proteids also occurring in the normal animal, having the power of destroying the poisons produced by various microbes. Myco-phylaxins and toxo-phylaxins similarly will denote the two subclasses of the phylaxin group.

THE HUMAN MOUTH AS A FOCUS OF INFECTION.[1]

BY DR. W. D. MILLER, BERLIN.

"DURING the last few years the conviction has grown continually stronger, among physicians as well as dentists, that the human mouth, as a gathering place and incubator of diverse pathogenic germs, performs a most significant *rôle* in the production of various disorders of the body, and that many diseases whose origin is enveloped in mystery, if they could be traced to their source, would be found to have originated in the oral cavity."

Dealing with the subject of diseases of the human body which have been traced to the action of mouth bacteria, he said: "In conformity with the nearly unanimous verdict of all recent investigations, decay of the teeth must be regarded as the most widespread of all parasitic diseases to which the human body is subject, and although, as far as the life of the patient is concerned, the prognosis is exceedingly good, and decay of the teeth may be pronounced one of the most trivial disturbances of the human economy, yet, if we take into consideration the results which follow a case of general decay, particularly in the mouths of young or weak persons, it often becomes a disease of a very grave nature. I venture to say that most dentists will agree with me that the havoc wrought by dental caries in the mouths of vast numbers of children, or even adults, among the lower classes is a much more serious thing than an attack of chicken-pox, rubeola, or even measles. Among the more immediate results of caries of the teeth may be mentioned diseases of the pulp and pericementum; following these, alveolar abscess, which is produced by germs and their products passing from the root canal through the foramen apicale into the surrounding tissue. Primarily of a local character, it is very frequently accompanied by general symptoms of varying intensity, and sometimes attended by complications of most serious nature, death from alveolar abscess being by no means as rare an event as is usually supposed. Croupous pneumonia must be regarded as a disease in all probability closely dependent upon the condition of the mouth. The uniform results obtained by the investigators on the subject of pneumonia for the last five years leave little room for doubt that the cause of this important disease is to be sought for in a species or group of micro-organisms which are constantly present in the sputum of persons suffering from pneumonia, and very frequently even in the saliva of quite healthy persons. The infectious

[2] I have to thank Dr. Donald MacAlister for his kind assistance in helping me to coin these names.

[1] Paper read in the Section of Bacteriology at the International Congress of Hygiene.

anginæ (tonsillitis, amygdalitis infectiosa, &c.), with their severe complications, have been shown by the observations of Bouchard, Von Hoffmann, A. Fraenkel, Fürbringer, Heubner, and Bahrát, Apolant, Leyden, &c., to be due to the localisation of germs in the tonsils. Writers on the subject of angina Ludovici designate slight wounds or other breaks in the continuity of the mucous membrane, diseased teeth, the tonsils, and salivary ducts, &c., as points of entrance for the specific germs of the disease, while the diseases of the maxillary sinus are known to owe their origin, in the great majority of cases, to diseased teeth. In connexion with pneumococcus abscesses, I call attention to the fact that the micrococci of sputum septicæmia, as shown by various authorities, possess invasive properties of the highest order, so that there is scarcely a part of the human body which may not fall a prey to their action. I may mention here parotitis, multiple subcutaneous abscesses, tonsillitis, otitis media, abscesses of the mastoid process, peritonitis, and meningitis." Many other infections were described in this connexion.

"The investigations of different bacteriologists during the last five years have brought to light a great number of pathogenic micro-organisms, some of which occur in the mouth with considerable frequency, others having been met with but a few times. On account of the large number of different micro-organisms commonly found in the human mouth, it is, with few exceptions, absolutely impossible to arrive at any conclusion regarding the presence or absence of any particular kind by a simple microscopic examination. Cultures on agar-agar also often fail of their purpose, since many pathogenic mouth bacteria do not grow on this culture medium, or they grow so slowly that they are soon overgrown and hidden by the more proliferous saprophytes of the mouth. Gelatine is still less adapted to the purpose. We must consequently have recourse to the animal body for the purpose of isolating such pathogenic micro-organisms as may be present in the saliva at the time of the examination. The person whose saliva was to be examined was always instructed to intermix the saliva by rubbing with the tip of the tongue against the cheeks and gums with dead epithelium and other films and deposits which are often clinging to the mucous membrane, and constantly carry enormous numbers of organisms. One or two of these drops were then injected into the abdominal cavity of a white mouse. Of the 111 mice thus operated upon, 27 died within 15 hours; 22 in 15 to 24 hours; 18 in 24 to 48 hours; 8 in 2 to 4 days; 9 in 4 to 8 days; 13 in 8 to 20 days; 4 in 20 to 40 days; 10 being still healthy after the expiration of 30 days were put down as having escaped infection; though it is quite possible that one or the other of these 10, if kept longer under observation, would still have succumbed to the effects of the inoculation. In nearly all cases where the mice died within five days, the cause of death was found to be acute peritonitis or blood-poisoning, or both combined; whereas in the great majority of cases where death did not occur till after five days, no micro-organisms were found in the blood, death being due to local suppurative processes alone. We may accordingly make two grand subdivisions of the pathogenic mouth bacteria. The first includes those which produce speedy death through blood-poisoning, with comparatively slight local reaction; the second, those which induce fatal pyogenic processes at the point of injection. With very few exceptions, injections with the blood or peritoneal exudations of the deceased mice produced the same results as injections with saliva. In the 111 examinations above recorded, capsulated cocci or diplococci, which according to present usage would be called micrococci of sputum septicæmia, were found in the blood of the mice 58 times, and, apart from these cases, three times in the peritoneal exudations—i.e., in all, sixty-one times. Micrococcus tetragenus was found in all twenty-six times. During the earlier experiments my attention was directed solely to the micrococcus of sputum septicæmia, and I may have overlooked other organisms, so that in all probability the other species mentioned in reality occur still oftener than indicated by my figures. Accordingly, the micrococcus of sputum septicæmia occurred sixty-one times; micrococcus tetragenus occurred twenty-eight times; megacoccus buccalis muciferens occurred four times; bacillus buccalis muciferens occurred three times; bacillus buccalis septicus occurred six times; bacillus pneumoniæ once. Besides these, various other micro-organisms of pathogenic significance were met with (apart from the pyogenic ones), which I was not able to study more closely. Twice streptococci were found in the blood.

"From the time that Pasteur discovered a deadly micro-organism of the form of the figure 8 in the human saliva up to the present, developments regarding the nature and significance of the micrococci of sputum septicæmia have followed each other in rapid succession. Besides Pasteur, Raynaud and Lannelongue, Vulpian, Morgiggia and Marchiafava, Bochefontaine and Arthaud, Sternberg, Claxton, Gaglio and di Mattei, Griffin, Klein, A. Fraenkel, myself, and, more recently, scores of others have furnished contributions to the subject of the toxic properties of the saliva." The author then proceeded to give in detail a description of the various micro-organisms found in the human mouth capable of producing septicæmia. He also described the megaccoccus buccalis muciferens, bacillus buccalis muciferens, bacillus pneumoniæ (pneumobacillus), and the bacillus buccalis septicus. Continuing, he said: "Most observers agree that the micrococci of sputum septicæmia speedily lose their virulence when cultivated on artificial media. Ten days, seven, even five days are named as the maximum time for which the cocci remain virulent when cultivated on agar-agar, blood serum, &c. The results which I have obtained do not quite accord with the above. A culture of the micrococcus of sputum septicæmia II. from the blood of a mouse, on blood serum, dated May 6th, which was kept for seven days at a temperature of 35° C., subsequently at room-temperature, was used for inoculating a mouse in the abdominal cavity on June 7th. The mouse died inside of twenty hours, showing a pure culture of the cocci in the blood. A culture of micrococcus II., twenty nine days old, caused death in sixty-five hours; a culture forty days old failed to produce any effect. The cocci were found exceedingly resistive to the action of low temperature; a mouse, dead of an infection with micrococcus II., was hung up outside of the window for twenty-one days, between Dec. 22nd and Jan. 13th, the temperature ranging during nearly the whole time between 5° and 15° C. below zero. At the end of this time the mouse was thawed out, and an infection made with the blood resulted in the death of the infected animal inside of twenty-four hours. Regarding experiments relating to the question of immunity, it has been well established that immunity may be conferred upon animals by infecting them with material which has been so far weakened in its virulence that the animals sicken, but recover. A subsequent infection, even with a fully virulent culture, may then be harmless. I have attempted to produce immunity (1) by injecting 0·5 ccm. of dog blood direct from the artery into the abdominal cavity of mice. Dogs being immune from sputum septicæmia, it was hoped thereby to confer immunity upon the mice. All experiments with dog blood, however, turned out negatively. The blood of a large American rabbit, which had been infected without showing any reaction, conferred a partial immunity upon mice, they dying not until the fifth or seventh day after infection, while the control mice died within twenty-four hours; (2) mice were fed for several days on large quantities of saccharine, with a view to so saturating them with this material that they would not furnish a suitable culture medium for the cocci; results here also only negative; (3) a large number of antiseptic solutions were made use of, injecting the mice before or after, or both before and after the infection in the abdominal cavity, or subcutaneously with varying results, sometimes the death of the animal being hastened, sometimes slightly retarded. The only substance with which I attained positive results was a 1 per cent. solution of trichloride of iodine. If we inject a mouse subcutaneously with two drops of the water of condensation from a fresh agar-agar or blood serum culture, or with a slight quantity of diluted infectious blood, and follow up the injection through the same conule with 0·3 ccm. of a 1 per cent. solution of trichloride of iodine (the maximal dose for a full-grown mouse), the animal will in most cases survive the infection, though it will lose a piece of skin as large as a finger-nail.

"The question to which I wish here to call particular attention concerns the measures which should be taken to prevent the undue growth of bacteria, pathogenic as well as non-pathogenic, in the mouth; the ultimate object being not alone to limit as far as possible the action of micro-organisms and their products upon the teeth, but to keep within bounds as well the many various diseases which, we have seen, may result from a lack of proper care of the mouth. Not one of the many mouth washes with which the market is flooded makes even an approach towards accomplishing this end. For the purpose of disinfecting the mouth in cases of acute diseases, stomatitis, diphtheria,

gangrene of the mouth, &c., physicians usually have recourse to borax, boracic acid, chlorate of potash, permanganate of potash, lime water, salicylic acid, &c., which, with the single exception of salicylic acid, have next to no action whatever upon the bacteria of the mouth, though some of them have undoubtedly an excellent cleansing action upon inflamed or suppurating surfaces, in virtue of which their use may be attended by very beneficial results." The author stated that sublimate, 1 in 2000 (eight tests), effected a marked diminution in the number of germs in one minute; the complete sterilisation, however, required on an average over five minutes. The efficacy of the sublimate was increased in a surprising degree by the addition of benzoic acid. Trichloride of iodine, 1 in 2000 (seven tests), required an average time of about a minute and a quarter, proving to be decidedly superior to the bichloride. It is also far less disagreeable than the latter—in fact, not at all disagreeable; it has, however, which must be considered as a great misfortune, an acid reaction, and is, therefore, not suited for daily use as a mouth wash. In the strength of 1 in 1500 (one test) the sterilisation was accomplished in forty seconds. After stating that in order to obtain practical results it was necessary to test the action of the solution on the bacteria in the mouth itself, rather than on pure cultures in bouillon, Dr. Miller described three methods of sterilisation, and enumerated the various agents he employed, with their respective values. He concluded that an examination of the results would soon convince one that there are very few substances at present in the dental materia medica which are available for disinfecting the human mouth. "A mouth wash which I recommended years ago, and which is decidedly superior to the best of the many so-called antiseptic mouth washes on the market, has the following construction:—R: Acid. benzoic, 3, 0; tinct. eucalypt., 15, 0; alcohol. abs., 100, 0; ol. menth. pip., 0, 75."

THE PROPAGATION AND PREVENTION OF RABIES.[1]

BY GEORGE FLEMING, C.B., LL.D., F.R.C.V.S.

IT is now generally accepted by those who have most carefully studied the subject that rabies is a purely contagious disease, due to a virulent principle or specific agent, and is as a rule transmitted from a diseased to a healthy creature by inoculation. The specific agent, when introduced into the body of a susceptible animal, more particularly localises itself in the nervous system, and after a certain period, which is somewhat indefinite in accidental inoculation, but definite in experimental inoculation, causes such disturbance in the functions of the brain and spinal cord as to give rise to well-marked symptoms and a morbid condition that, it may be asserted, invariably terminates in death. Inoculation and infection occur through wounds which are generally inflicted by the teeth of creatures affected with rabies. Of all the domesticated animals which may become affected, the dog is certainly the one which is by far the most frequently attacked, and it is the one which perpetuates the malady. It is undoubtedly the chief, if not the only, propagator of the scourge in this and other countries; and it is therefore exceedingly probable—nay, certain—that if the canine species were completely freed from rabies the disease would be no longer known. Recognising this fact, and in view of the constant virulency of the saliva of rabid animals, and consequently of danger from their bites, and the serious consequences resulting therefrom, the importance of sanitary measures applicable to this animal cannot be over-estimated. In the interests of mankind, no less than in those of the domesticated animals, and particularly of the dog itself, this very alarming, most painful, and always fatal disorder should be suppressed. And of all the known contagious diseases, rabies is the one which can be most easily and quickly extinguished, provided proper measures are prescribed, and are carried stringently and energetically into operation.

The measures necessary for the extinction of the disease must be based on the fact that the dog is the chief—nay, sole—propagator of rabies; that the contagium or infecting material is conveyed from the diseased to the healthy by means of bites (other means are so exceedingly rare that they may be left out of consideration); and that to free a country from it, all rabid and suspected dogs should be destroyed, certain restrictions maintained for a limited period, and only dogs from other countries exempt from rabies allowed admission. Dogs coming from infected or suspected countries should undergo a period of quarantine equal at least to the longest period of latency of the disease. That the disease can be limited or altogether suppressed by the enforcement of proper measures there is an abundance of evidence to prove. Sweden, Norway, Switzerland, Baden, Prussia, Bavaria, Wurtemburg, and other countries have been freed from it by such measures; while countries in which it has never been seen, as Australia and New Zealand, are preserved from its invasion by such precautionary measures as quarantine of imported dogs, or, as in Sweden, total prohibition of importation of dogs.

That the dog is the chief sufferer from, and, it may be asserted, the sole propagator, of the malady is amply proved by every-day experience; but the following table, showing the number of cases of rabies in England during the four years 1887-90, and the number and species of animals affected, affords further evidence:—

Kind of animal.	1887.	1888.	1889.	1890.
Dogs	217	160	312	129
Cattle	11	2	9	2
Sheep..	5	7	11	—
Swine..	3	—	4	1
Horses	4	5	4	2
Deer	257	2	—	—
Total	497	176	340	134

It will be observed that in 1888 and 1889, 90 and 91 per cent. of the animals reported as rabid were dogs, and in 1890 the percentage was more than 96. The animals other than dogs were infected by rabid dogs, and these infected each other; as the mad dog has always the strongest tendency to attack its own species, it follows that this furnishes by far the largest proportion of victims. The suppressive sanitary police measures are, in the order of their importance—(1) Destruction of all dogs which are rabid, or which are suspected of being or becoming rabid; (2) the seizure and, if need be, destruction of all ownerless and wandering dogs; (3) all other dogs to wear a properly constructed and well-fitting muzzle while rabies prevails, and also for a period equal to the longest interval of latency after the malady has been suppressed; (4) the imposition of a tax upon all dogs.

1. The necessity for the destruction of all rabid dogs is so self-evident that it need not be further insisted upon. The disease is incurable, causes much suffering, and the affected dog is, so long as it lives, so great a danger to other creatures that its speedy destruction is imperative. A suspected dog may be defined to be one that presents symptoms resembling those of rabies, or which has been in conditions that have rendered infection probable or possible.

2. Wandering dogs are the chief agents in the propagation of rabies, for the reason that they are more exposed to contamination than those which are properly cared for, and also because rabid dogs, even when carefully guarded, seek to wander from home. In proportion as wandering dogs abound in infected countries, so is the disease prevalent. This is a well-established fact. Therefore, in order to limit the propagation of rabies, all wandering dogs should be secured, and, if not claimed within a certain period, destroyed.

3. Rabies being transmitted, as a rule, by the bites of dogs, and as in countries in which the disease prevails there can be no certainty when a dog is not infected, if it at all times be prevented from inflicting wounds by its teeth, it is evident that the danger of extension o the malady must be reduced at least to a minimum. Dogs can be hindered from biting by causing them to wear a properly constructed muzzle; and if it fits well, it should cause very little, if any, inconvenience to them. The value of the muzzle in suppressing rabies has been demonstrated on many occasions, and in serious outbreaks of the disease its introduction has always coincided with a diminution in the number of cases and the eventual extinction of the scourge. Its use is also coincident with a decrease

[1] Paper read in the Section of the Relation of Diseases of Animals to those of Man at the International Congress of Hygiene.

in the number of cases of hydrophobia occurring among people during such outbreaks and their ultimate cessation. The evidence in support of this statement is so voluminous and explicit that anyone examining it must be convinced as to the certainty of the fact. [The city of Berlin, Vienna, Holland, the Duchy of Baden, and Sweden were cited as instances in support of the statement.] In England the value of the muzzle has been as well exemplified as elsewhere, though its application has always been extremely partial, being only employed in towns or districts when rabies has increased to such an extent as to create alarm, and removed immediately when the disease had for the time disappeared. No effective action has at any time been taken to suppress it in England or Ireland; in the latter country it is always more or less prevalent, and ever since it was first legislated for in England it has maintained a permanent existence in the following fourteen counties—viz., Chester, Derby, Essex, Hants, Kent, Lancaster, London, Middlesex, Notts, Surrey, Sussex (East), Sussex (West), Warwick, and York (W.R.). During the past year cases of rabies were reported for the first time in three counties previously free from it; these were Bucks, Norfolk, and York (E.R.); and it was reintroduced into Leicester after an absence of two years, and into Stafford, which had been free for one year. The extent to which rabies has prevailed in this country may be judged from the loss of human life through bites from rabid dogs. It is stated that in England (including Wales) there have been 939 deaths from hydrophobia recorded during the past thirty-eight years, the yearly average for the first sixteen years being eight, for the next sixteen years fifteen, and for the remaining period ending in 1885 forty-five. Thus, the mortality has steadily advanced through more than 400 per cent. On the other hand, the Prussian preventive measures have reduced deaths from hydrophobia to a remarkable degree; for while in the decade ending in 1819 there was a yearly average of 166 deaths, in a similar period ending in 1886 there was a yearly average of four and a half. The value of the muzzle in suppressing rabies has been, perhaps, best demonstrated in London on several occasions, and especially in 1885. In the previous years hydrophobia had increased to a very alarming extent, as has just been mentioned, in England, and no steps worthy of note had been taken to check the mortality. For London alone in that year no fewer than twenty-seven deaths of people were reported as due to the bites of rabid dogs. A muzzling order was then enforced, and at the end of 1886 not a death was recorded. Unfortunately, the order prescribing the use of the muzzle was then rescinded, and in a few months a case of hydrophobia occurred in the south of London, soon to be followed by others, and in 1889 ten deaths were registered. In July of that year the muzzling order was again issued and stringently carried out, and rabies and hydrophobia once more disappeared. In other countries where rabies prevails and dogs are not muzzled, though other measures, as the dog tax, medal on the collar, leading by a leash, &c., are enacted, the malady continuously manifests itself, and numbers of people perish from hydrophobia every year. We may give Belgium and France as examples. In the latter country the monthly sanitary bulletin shows to what an extent it was prevalent, and I need only refer to the last two which I have to hand, those for March and April of the present year. In March 132 dogs and 8 cats were destroyed as rabid, besides those sacrificed as a preventive measure; while thirty-two persons were bitten by mad dogs, as well as cattle and pigs. In April 151 dogs and 4 cats were destroyed because of being rabid, and a large number were killed because they had been bitten by mad dogs or were wanderers; and forty-seven persons were wounded by mad dogs. The reports of the Pasteur Institute show that by far the largest proportion of persons protectively inoculated are French. There can be no doubt that if the use of the muzzle were enforced generally and strictly throughout France, rabies would quickly vanish from the sanitary bulletins. Belgium has tried all the otherrecognised measures except the muzzle, and yet the malady is as rife and deadly as ever. A Royal Commission was recently appointed to inquire into the subject, and the report addressed to the Superior Council of Hygiene in April last states that the regulations in force are insufficient, and while not contesting the value of Pasteur's preventive inoculations with regard to people bitten by rabid dogs, it is urged that there is something far more desirable, and that is the extinction of the disease in the canine species. For this object the Commission insists upon the immediate adoption of the muzzle.

Senseless sentimentality has opposed the use of this article in a most extraordinary manner in this country, and one would be inclined to believe that there are people who care less for human suffering and human life than for a little inconvenience or discomfort to dogs. A well-fitting muzzle should cause very trifling inconvenience and discomfort, while ensuring absolute safety from dog-bite. Repeatedly rabid dogs have been brought to veterinary surgeons wearing muzzles, and so rendered safe; as it is a well-known fact that a diseased dog will, in nearly every instance, allow those it knows to handle it and put on a muzzle. A leash only is no protection, for the dog can bite and is as dangerous as if not led. Frequently rabid dogs on the leash are brought to veterinary surgeons. It is also perfectly obvious that a collar, no matter how embellished and bemedaled, will no more prevent rabies, or hinder dogs from biting, than will a linen collar on a man's neck preserve him from small-pox or influenza. But we need not stay to notice these ridiculous notions.

4. The imposition of a dog tax and registration is necessary to limit the number of dogs, and to ensure that every one has an owner, who should be held responsible for any damage it inflicts. From this measure no dog owner should be exempt. If an entire country is infected with rabies, then suppressive measures should be applied to the whole area, uniform and energetically, until the malady is perfectly extinct. If only a portion of a country is visited by it, then it is questionable whether such measures should be limited to that portion only. If it were possible to keep all the dogs it contains within its boundaries, then such a step would suffice, if a certain zone around it were established beyond which no infected animals should pass. But it would be extremely difficult, if not impossible, to establish such a barrier; and to effectively rid a country of rabies, though only partially infected, the sanitary police measures should be applied to the whole. That such a result is possible has been proved by the experience of the countries I have named, and from these examples, and what we know of the disease, it may certainly be affirmed that rabies need only exist in a country which does not desire to get rid of it. The United Kingdom can quickly and easily free itself from it, and keep itself free if it cares to do so, and a heavy responsibility for the loss of human life rests upon those who oppose, or who do not choose to adopt, the measures indicated. Continental nations with coterminous frontiers should combine in a simultaneous effort to abolish a scourge which creates so much dread and causes so much suffering and terrible death to man and beast. Such a consummation can be realised, and it only needs the will to effect it.

THE MEDICAL SUPERVISION OF THE MERCANTILE MARINE.[1]

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THE few observations I am about to present to this meeting will refer more particularly to the Port of Liverpool, with which I have been connected for many years, and will apply to the system, or rather want of system, in the medical supervision of the mercantile marine; and I trust that my remarks will not be thought in any way reflecting upon gentlemen who discharge the various duties they are called upon to perform in an able and satisfactory manner as far as their separate and isolated position will permit. In an old country, where regulations have been made to meet the requirements and necessities of a growing population and extended communications with other countries, it must naturally be expected that some of them will become obsolete, will not answer the purpose for which they were intended, and, if not in opposition, certainly do not work harmoniously with others; and it is with the view of obtaining a more efficient system by the consolidation of the powers of the various authorities that I have been induced to trespass upon your time with this paper.

[1] Paper read in the Military and Naval Section of the International Congress of Hygiene.

All emigrants are examined on embarkation by doctors appointed by the Board of Trade. The Customs appoint a quarantine officer to visit all inward bound ships on which there is infectious disease, and there is the medical officer of health of the port sanitary authority, who acts under the authority of the Local Government Board. On an average above 200,000 emigrants sail from Liverpool annually; the greatest number generally leave in April, May, August, and September. As many as 2000 or 3000 will occasionally sail on one day. These people are medically inspected as they board the ships, and should any of them appear unwell they are carefully examined, and, if necessary, rejected. The result of these inspections is communicated to the Board of Trade; but no report is sent to the port sanitary authority on the subject, and it is only by accident that the medical officer of health learns that cases of infectious disease have been rejected. It has occurred that patients suffering from small-pox and scarlatina have been re-landed on the stage amongst a crowd of people and taken to lodging-houses, and in some few instances have taken their departure by train and returned home. This system is not at all satisfactory; the emigrants ought to be examined in a properly appointed place before going on shipboard. When the emigrants spend a day or two in the lodging-houses they are visited by doctors engaged for the purpose by the shipping companies, but to lessen expense many emigrants are taken direct to the ships on their arrival by train. The introduction of so many strangers into Liverpool has led to outbreaks of cholera, small-pox, relapsing fever, &c., in the city, and it is most essential that the existence of infectious disease amongst emigrants should be ascertained as soon as possible, and communicated at once to the health authorities. Further, it is necessary for the safety of the emigrants themselves that only those in health should be taken on board ship, as it is impossible for the one doctor to supervise 800 or 1000 people, the majority of whom may be suffering from the discomforts of a voyage.

Whatever sickness occurs on the outward passage of an emigrant ship is not reported to the health authorities, and only cases of sickness existing at the time of the vessel's return are reported through the Customs. For want of this information the conditions on shipboard are concealed, and much mischief may ensue. Very recently several outbreaks of diphtheria occurred on one of the large steamers, and no information was given by the ship's doctor or the owners, and the medical officer of health only learnt the fact by hearing from the United States that passengers suffering from the disease had been placed in quarantine. No doubt returns are made to the shipping companies, but they are private, and not available by the health authorities.

The emigration doctors have many duties to discharge, besides those already mentioned, in accordance with the regulations of the Board of Trade—viz., to see that the sanitary conveniences are satisfactory, that there is no overcrowding of passengers or crew, that no nuisances exist, &c. Most of these matters are by the Public Health Act of 1875 subject to the port sanitary authority; for Section 110 states "That any ship or vessel lying in any river, harbour, or other water, within the district of a local authority, shall be subject to the jurisdiction of that authority in the same manner as if it were a house within such a district."

We now come to an important consideration which has not only a local but a general interest, and is variously looked upon by different countries. So far as England is concerned, we may say that quarantine is abolished, for though the Quarantine Act of 1825 exists, it is never enforced, except in the case of yellow fever. Quarantine stations, once so numerous around our coast, have been swept away, with lazarettos and their expensive establishments; no pest houses, airing hulks, or fumigating apparatus exist; they have disappeared and are not missed. To satisfy the fears of the timid and gratify the admirers of old customs two or three disused men-of-war are moored at the Mothertank, off the Isle of Wight, with a staff of well-trained officers and men to deal with any vessel ordered by Her Majesty's Government to be placed in quarantine. In Liverpool we have a quarantine officer appointed by the Customs authority to carry out the Quarantine Act, and by a general order of that body he is instructed to visit all ships arriving with infectious disease on board (except cholera), and should the disease be plague or yellow fever he is to place them in quarantine; in the case of the other infectious diseases the Customs officer is directed to communicate the fact to the medical officer of health, who then takes charge of the patients and ship. Some few years ago a vessel was put in quarantine in the Mersey because some cases of yellow fever had occurred on board during her homeward passage; and, after being detained several days, application had to be made to the port sanitary authority to take charge of the ship before the Privy Council could release her.

The Privy Council have power reserved to them under the old Quarantine Act, which is re-enacted by the Public Health Act of 1875, to deal with every form of infectious disease. Excluding cholera ships, which, by a special order of the Local Government Board, are placed under the control of the medical officer of health, all other infected ships are to be visited by the Customs medical officer, and are liable to quarantine. By the Act 39 and 40 of Victoria, c. 36, sec. 234, the Privy Council may from time to time require that no person shall land from a ship coming from a place infected with yellow fever, or other infectious disease, until the officers of the Customs have examined into the state of health of the persons on board, and given permission to land, any person being liable to a penalty of £100 for disobedience. These powers of the Customs, acting under the authority of the Privy Council, are in a measure antagonistic, and opposed to the satisfactory working of the port sanitary authority. Section 110 of the Public Health Act, 1875, as amended by the Public Health (Ships) Act, 1885, gives every power to the local authority to deal with infected ships. The section as amended reads as follows: "For the purposes of the provisions of this Act relating to nuisances, and also for the purposes of the provisions of this Act relating to infectious diseases and hospitals as are contained in Sections 120, 121, &c. Any ship or vessel lying in any river, harbour, or other water within the district of a local authority, shall be subject to the jurisdiction of that authority in the same manner as if it were a house within such district; and any ship or vessel lying in any river, harbour, or other water within the district of a local authority shall be deemed to be within the district of such local authority as may be prescribed by the Local Government Board; and where no local authority has been prescribed, then of the local authority whose district nearest adjoins the place where such ship or vessel is lying. The master or other officer in charge of such ship or vessel shall be deemed for the purpose of the said provisions to be the occupier of such ship or vessel." By this section the port sanitary authority has equal power with the quarantine officer in dealing with infectious disease on board vessels, excepting that of placing them in quarantine. They can direct the cleansing and disinfection of any ship or any part of it, or of any articles likely to retain infection, so as to check or prevent infectious disease; they may direct the destruction of any bedding, clothing, or other articles which have been exposed to infection from any dangerous infectious disorder, and may give compensation for the same; they may remove to hospital any person who is suffering from any dangerous infectious disorder, and is on board any ship or vessel, provided the patient is willing to be removed; should the patient object, an order can be obtained on the certificate of the medical officer of health from any justice for his compulsory removal, and any person who wilfully disobeys or obstructs the execution of such order is liable to a penalty not exceeding £20; they may make regulations for the removal and keeping in hospital, as long as may be necessary, any person brought within their district by ship or boat, who is infected with a dangerous infectious disorder. These powers are sufficient to deal with the ordinary infectious diseases, small-pox, scarlatina, measles, &c., where it is not necessary to detain a vessel, but with cholera other powers are required, which the Local Government Board have conferred on port sanitary authorities by an order dated Aug. 28th, 1890, which reaffirms the provisions contained in previous orders. By this order, if an officer of the Customs ascertains from the master of a ship, or has reason to suspect that a ship is infected with cholera, he shall detain such ship, and order the master to anchor or moor the same in such position as he directs. While such ship is so detained no person shall leave the same. The officer of Customs detaining the ship shall forthwith give notice to the sanitary authority, and his detention of the ship shall not cease until it has been visited and examined by a medical

officer of health, unless the examination be not commenced within twelve hours after notice given to the sanitary authority. The medical officer of health, if he have reason to believe that any ship within the district of his sanitary authority, whether examined by the Customs officer or not, is infected with cholera, or shall have come from some place infected with cholera, shall visit and examine such ship, and give a certificate stating whether the ship is or is not infected with the disease. The master of a ship certified to be infected with cholera shall anchor or moor it at the place appointed by the sanitary authority and the chief officer of the Customs. The medical officer of health shall examine every person on board, and in the case of any person suffering from cholera, or from any illness which the medical officer suspects may prove to be cholera, shall certify accordingly, and any person not so certified shall be permitted to land immediately on giving to the medical officer of health his name and place of destination, stating, where practicable, his address at such place, and the name and address of such person shall forthwith be transmitted by the clerk of the sanitary authority to the local authority of the district in which the place of destination of such person is situate. Every person certified by the medical officer of health to be suffering from cholera shall be removed, if his condition permit of it, to some hospital, and no person so removed shall leave such hospital until the medical officer of health shall have certified that such person is free from the said disease. If the person suffering from cholera cannot be removed, the ship shall remain subject, for the purpose of this order, to the control of the medical officer of health, and the infected person shall not be removed from or leave the ship, except with the consent in writing of the medical officer of health. Any person certified to be suffering from illness which the medical officer of health suspects may prove to be cholera may either be detained on board ship, or taken to some hospital and detained two days to ascertain whether the disease is cholera or not. The medical officer is further instructed to give such directions and take such steps as may be necessary to prevent the spread of infection, such as the disposal of dead bodies, the destruction or disinfection of clothing, the disinfection of the ship, &c.

The above is an epitome of the order of 1890, but orders of a somewhat similar character were previously made, and under these a number of cholera ships were treated, more particularly during the prevalence of cholera in Marseilles and the neighbourhood in 1884, when several vessels having and having had cholera on board arrived in the Mersey. Since then vessels have arrived from infected ports in Spain and France and have been medically examined, and in no single instance has a case of cholera occurred among the passengers who were permitted to land, or among the inhabitants of Liverpool. The powers of the order were amply sufficient, and secured the objects of relieving the sick and preventing the extension of the disease. Far different was the state of things in 1866, when cholera ships were treated under the Quarantine Act. I had then the sad experience of seeing the sufferings of the sick and the spread of disease, thus affording a striking contrast between the old and the new systems, and presenting the most positive evidence of the great advance of sanitary knowledge.

If a disease like cholera can be controlled by medical inspection, why not apply the same regulations to ships infected with yellow fever? From my long experience in dealing with infectious disease on land and ships, I am quite satisfied that similar provisions applied to yellow fever ships would be equally successful, and more likely to prevent the introduction and spread of disease than keeping the healthy and the sick together in quarantine.

In conclusion, I would suggest that all sanitary and medical matters appertaining to ships should be placed under the control and management of port sanitary authorities, acting under the direction of the Local Government Board; that the medical inspectors of emigrants and emigration ships should be officers of the port sanitary authorities and not of the Board of Trade; that the ships' doctors should report to the port sanitary authority all cases of sickness occurring on shipboard both on the outward as well as the homeward voyage; that the Quarantine Act should be repealed, and if it be thought necessary to retain any of its powers, let them be transferred to the Local Government Board; that the name of quarantine doctor be abolished, as the term is misleading, and that, instead of being a Customs officer, he should be transferred to the port sanitary authority as a medical inspector, to board all vessels having infectious disease on board; being armed with full powers, he could detain vessels if infected with cholera or yellow fever, and carry out the various regulations applicable to each case; and for the ordinary cases of infectious disease could order their removal to hospital, and the necessary disinfection and cleansing of the ships.

THE RELATION OF ALCOHOLISM TO PUBLIC HEALTH AND THE METHODS TO BE ADOPTED FOR ITS PREVENTION.[1]

By HARALD WESTERGAARD,

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An exhaustive solution of this question would require reliable details concerning the consumption of intoxicating liquors, but here we meet with great difficulties. In many cases the only fact given will be the average quantity consumed per head of population, and even this is not always stated correctly. But it is evident that the effect of alcoholism on public health depends not only on the average quantity consumed, but on the distribution of this quantity. Two countries consuming the same quantity of spirits per head of population may suffer very differently from their effects; in one country the quantity is perhaps uniformly distributed, whereas in the other there is a great number of total abstainers and of those habitually temperate, the mass of the intoxicating liquors being consumed by a small minority of the population. Evidently in the latter case the effects of alcoholism will present themselves in a much more appalling form than in the former. In the absence of facts showing this distribution it will be expedient to look for other data indirectly indicating the extent of intemperance. In most countries, for instance, more or less complete data regarding divorces of marriages can be had, and in several countries we will find that an enormous part of the divorces bear some relation to the abuse of strong liquors. The number of persons in different parts of the country who are somehow or other concerned in the liquor trade is also very illustrative of this question, if the great extent of the smuggling trade does not render them too inaccurate. Or I may mention the statistics of poor-houses and lunatic asylums, where the inmates very often are the victims of intoxicating drinks. The large number of police offences and crimes caused by alcoholic excess will show to what an extent in many countries alcoholism claims the attention of the public.[2] It has been tried several times to show the effects of habits of intemperance on mortality. We have thus a series of observations on the mortality among innkeepers, publicans, hotel servants, and persons in other trades tempting to indulgence in intoxicating drinks. The last supplementary report of the Registrar-General of Marriages, Births, and Deaths in England contains valuable facts of this kind, showing, for instance, for innkeepers between twenty-five and sixty-five years of age a mortality more than 50 per cent. higher than for the total population, whereas hotel servants presented an increase of 120 per cent. above the average rate of mortality being, among all the occupations chosen, that which shows the highest rate of mortality. Dr. Far has found during an earlier period that at the age of twenty-five the mean after-life time of publicans was thirty-one years, among the whole population thirty-six years, and of the clergy forty-two years, the latter being thus eleven years in advance of the publicans. But this high mortality is not an absolutely exact proof of the effects of intemperate habits. On the one hand, a number of the publicans may be supposed to be habitually temperate, the effects of intemperate habits on the remainder thus being so much greater; on the other hand, the high mortality may partly be ascribed to other causes, such as night work,

[1] Paper read in the Section of Preventive Medicine at the International Congress of Hygiene.

[2] A considerable number of facts bearing on these questions will be found in Dr. A. Baer's new work, Die Trunksucht und ihre Abwehr; Wien und Leipzig, 1890.

unhealthy and ill-ventilated rooms. Still, an examination of the causes of death will show that a considerable part of the high mortality is due to alcoholic drinks.

Another series of observations directly bears on the mortality among persons with different habits as to intoxicating liquors. To this class belong the experiences of the United Kingdom Temperance Institution, showing in the temperance section a mortality which is only three-fourths of that in the other section. These remarkable results are corroborated by other facts, as I shall try to show further on; but the principles adopted for these investigations having, as far as I know, not been published, they must as yet be accepted with some reserve. Another interesting and frequently quoted investigation is contained in Neison's great work, "Contributions to Vital Statistics," showing an appalling mortality among persons decidedly addicted to drinking, the number of deaths expected according to the mortality of the whole population being 110, whereas the actual number of deaths was not less than 357. The name of the author has secured to the investigation a great reputation, but we cannot altogether rely on it, the methods being not unobjectionable. On examining Mr. Neison's paper it will be found that the number of deaths is exactly equal to the number of persons "exposed to risk." We have thus only observations on persons who died during their exposure to risk, but not on those who outlived it. We would, therefore, not be able to find from these observations the mean duration of life among drunkards, but only their mean age at death. The great difference between these two expressions is well known. I may here only quote one proof by Dr. Farr in his posthumous work, "Vital Statistics," p. 457: He found that, whereas the mean duration of life in Sweden at the beginning of this century was thirty-nine years and in England, somewhat later, forty-one years, the mean age at death was respectively thirty-one and twenty-nine years. Judging only from the latter calculation, a statistician would be led to the conclusion that the mortality was smaller in Sweden than in England, whereas in reality at that time the reverse was the case. The only difference between this statement about the mean age at death and that which would have been found from Mr. Neison's observations is this—that the latter only date from the day the persons under observation were supposed to begin their intemperate habits, and not from their birth or some fixed age; but in reality the principles are the same. The only way of getting correct materials would be to watch a number of drunkards during a certain period just as a life office follows the insured persons from one year to another, calculating the rate of mortality among the whole number exposed to risk. It would not be difficult for a body of medical men to collect useful data of this kind by following for some years persons of intemperate habits among their clients.

An interesting investigation, corresponding to Neison's, has recently been made by Dr. Isambard Owen, who has calculated the mean age at death of persons of different habits with regard to intoxicating liquors.[3] It was found that the mean age at death for total abstainers was eleven years shorter than that of "habitually temperate" persons (exactly the same difference as found by Dr. Farr between the mean duration of life for publicans and clergymen) and one year shorter than of "decidedly intemperates." This result may arise solely from the fact, suggested by Dr. Owen in explanation, that the total abstainers are more frequently found in the younger generation than in the older; for among young persons naturally several premature deaths will take place, thus reducing the mean age at death. But the report gives very interesting particulars in two other directions. First, as to the causes of death, which are carefully recorded in Dr. Isambard Owen's paper; secondly, as to the distribution of the population according to different habits. It appears from the report that about one-seventh to one-sixth of the persons under observation were decidedly intemperate; about the same number were "free drinkers"; and more than one-fourth "careless drinkers," leaving only somewhat more than two-fifths for total abstainers and the habitually temperate. It may be objected that, as the mortality among intemperate persons is probably much greater than among temperate persons, the former class will show proportionately more deaths than the latter; but, even if this would diminish the proportion of intemperates considerably, the fact remains that a very great part of the male population in England must be said to be addicted to drinking.

[3] Brit. Med. Journ., June, 1888.

What is now the effect of alcoholism on public health? What are the losses of life caused to a population by intemperance? This question can to a certain extent be answered by examining the causes of death, especially delirium tremens and chronic alcoholism. It has been objected that these causes of death supply an unsatisfactory picture of drinking excess, because the wish to spare the feelings of surviving relatives makes returns of such deaths less trustworthy, and it has therefore been proposed to use other diseases as a measure—such as liver disease (especially cirrhosis of the liver). Yet it is worth while to examine the above-mentioned causes of death. Through the courtesy of the Danish statistician, Dr. Carlsen, I have been enabled to study the mortality from these causes during a year in different classes of society in the urban population of Denmark. I have thus found that among males above twenty years of age from 5 to 6 per cent. of all the deaths registered were ascribed to delirium tremens, chronic alcoholism, and sudden death in drunken fits (*mors inebriitate*, not including fatal accidents). In one-third of all these cases a combination of some of these causes with other causes was registered, but in reality the number of such cases is undoubtedly much greater, thus giving the above-named percentage a considerable increase. In the class of working men the proportion is still greater, as will appear from the following table:—

Age.	Whole Male Population.			Working Class.		
	Total number of deaths.	Deaths from alcoholism.		Total number of deaths.	Deaths from alcoholism.	
		Absolute number.	Per-centage.		Absolute number.	Per-centage.
20	218	1	—	100	1	—
25	320	24	6	193	19	10
35	517	48	9	256	25	10
45	581	52	9	220	25	11
55	756	43	6	248	22	9
65	604	20	3	151	7	5
75	324	5	1	72	2	—
Total	3596	193	5·4	1244	101	8

Out of twelve adult working men who died, one has thus fallen a victim to chronic alcoholism &c., and between the ages of twenty-five and sixty-five, 10 per cent. of all the deaths were ascribed to these causes.

If we calculate the influence of these causes on the table of mortality, we find that if these causes had not taken place, out of a certain number of males twenty years old, 12 per cent. more would reach the age of seventy-five than is the case now, and among working men even 15 per cent, and the mean duration of life would be increased by more than a year for an adult male person. Curiously enough, the mean duration of life for the two sexes, according to the Danish life-table, would under this supposition be nearly equalised. Immense as appear these losses of life, they are undoubtedly much greater in reality. It may be that the number of cases of delirium tremens and chronic alcoholism is approximately correct for the working class, and somewhat too small for the remainder. But, besides, we have numerous cases of liver disease (cirrhosis of the liver) and other diseases caused by drinking, not a few accidents due to the same cause, and, moreover, a considerable number of suicides connected with intemperance. Out of 100 male suicides in the towns, about forty-four were notoriously given to drinking, the absolute number of these cases being fifty to sixty every year. A still more striking fact is the following observation from the town hospital in Copenhagen. Out of 850 persons above twenty years of age treated for pneumonia, 558 were males and 292 females, and of these 558 males more than one-half—viz, 285—suffered from chronic alcoholism or delirium tremens (not to speak of those suffering from *delirium febrile*, whereas only eight female patients were attacked by these diseases. Subtracting these numbers, we find about the same number of male and female non-alcoholists. It is also an interesting fact that among the 285 male patients suffering from alco-

holism and delirium one-fourth died, whereas among the others only 13 per cent. died.

It is thus not improbable that the real losses of life on account of drinking are much greater than they appear to be from an examination of the tables of deaths directly due to alcoholism and delirium, and these effects of strong liquors are still more striking if we compare them with the mortality statistics of the Norwegian capital, Christiania. Whereas in Denmark there is a small excise on spirits, Norway has a very high one; and whereas Copenhagen has an excessive number of publicans—one for every 300 of the inhabitants—the Norwegian capital has only one public-house for the sale of spirits for every 5000 inhabitants. In Christiania, according to a communication to me from Dr. Berner, inspector of health, during twenty years only seventy-six deaths from alcoholism and delirium tremens have taken place, sixty-five among males, eleven among females; and there is reason to believe that the actual number of deaths from these causes is only slightly higher. Only $\frac{2}{3}$ per cent. of deaths among adult males have been due to these causes, while in Copenhagen the corresponding number was 5 per cent.; and while the suicides in Christiania were only 2 per cent. of the deaths among adult males, the corresponding figure in Copenhagen was 4 per cent. These facts speak very clearly of the effectiveness of the measures adopted in Norway, which have reduced the quantity of spirits consumed in that country to one-fourth of what it is in Denmark.

Bearing in mind the fact that in a population including total abstainers and temperates, as well as free drinkers and drunkards, the percentage of deaths ascribed to alcoholism in the range of age from which insurance companies are principally recruited is 5·4 per cent., we can understand that a temperance section of a life office does have such a favourable experience as stated above.

In most countries the statistics of the causes of death do not allow conclusions with regard to alcoholism corresponding to those for Denmark and Norway. But at all events the statistical data sufficiently show that a great part of the civilised world is suffering greatly from the effects of alcoholism. The investigations of the Harveian Society make it probable that in London one-seventh of all adult deaths (males and females) is directly or indirectly due to the consequences of alcoholic excess. But even confining ourselves to the number of deaths stated by the official statistics—probably only a fraction of the real number—we find in England an enormous loss of life. The mortality from alcoholism in 1871–80 among males twenty-five to sixty-five years old was about 1 per cent. of all deaths—nearly 800 yearly. What an amount of disease and poverty, of moral and physical degradation, is represented by these 800 deaths! In Belgium the yearly loss of life from delirium tremens among males was 330 in 1870–89. Still greater have been the devastations of drinking in Switzerland. Prussia has a yearly loss of 1100 males from delirium tremens. Undoubtedly we should find, if reliable data could be had, that chronic alcoholism and delirium tremens alone kill many thousands of men every year. What is to be done? I think that if the only result of this discussion were that the medical profession in all civilised countries were carefully to register all the cases of alcoholism within their reach, thus giving us a complete and reliable collection of data as to the effects of intemperance, we might congratulate ourselves, for nothing would serve better to open the eyes of the public. Medical men have it in their power through such investigations to render to society an invaluable service.

I may just in a few words touch upon the private efforts for diminishing alcoholism through public coffee rooms, temperance societies, bands of hope, &c. These efforts have undoubtedly saved many persons and families from moral, physical, and financial ruin, and they are necessary to quicken public opinion against strong drinks, and prevent the laws against intoxicating liquors from becoming a dead letter. Undoubtedly, homes for the cure of habitual drunkards, with or without State assistance, will prove useful when properly managed. Whether the efforts to ensure pure alcohol, with fines for the adulteration of alcoholic drinks &c., will prove salutary, or perhaps only produce more refined forms of drunkenness, seems to me rather more doubtful. Much harm may be done by recommending a pure drink in order to diminish the consumption of an impure one, and as far as I know no definite statistical proof has as yet been found that such a measure alone would tend to diminish intemperance. It has also been proposed to deprive drunkards of their freedom in financial matters, declaring them minors; and this, in addition to other measures, may help to create a public opinion against alcoholic excess, as well as the proposed alterations in the criminal laws punishing crimes committed in a state of drunkenness as, or even more, severely as those committed in a sober state, not to mention laws and police provisions against drunkenness.

High excises are generally looked upon as an excellent weapon against alcoholism. But we must not forget that even a very high excise, as in England, does not prevent spirituous liquors from coming within the reach of anybody, so long as the number of public-houses is so exceedingly large as in this country. If a person has to go a long way to get drunk, and if he has in addition to pay a good sum for it, he will stop to think before going. Still, high excises seem to have some effect: the German law of 1887 has, for instance, reduced the consumption of spirits to a certain extent. But generally the reduction of the consumed quantity does not seem to correspond with the increase of the excise. An interesting expedient is the new State monopoly in Switzerland. Ten per cent. of the surplus are left to the cantons for counteracting alcoholism. By regulating the price the monopoly acts like an excise, and the Government takes care that only unadulterated liquors are sold. The monopoly is reported to have had a good sanitary effect, and it has caused some decrease in the consumption of liquors.

In connexion with excise and duties every effort is to be commended which tends to render the access to intoxicating liquors more difficult. Among these measures the three popular American systems deserve our attention—viz., the "Maine laws," "local option," and the "high licence" system. The first of these expedients, the prohibitory system, has been tried in Maine and some other American States. According to this system it is prohibited to manufacture and sell intoxicating liquors, the only exception commonly being that liquors of "foreign production" may be imported and sold in the original packages. But this exception is unjust, permitting the man who can afford it to order as much liquor as he likes, and nearly all reports agree in testifying to the perpetual violations of these laws. I shall only mention one curious fact from Maine, where the system was adopted in 1881. During the year 1867–86, 8412 divorces of marriages took place, being probably several per cent. of the yearly number of celebrated marriages. Of these no less than 960, or 11 per cent., were caused by intemperance, combined or not with other causes. It thus seems that intemperate habits are rather frequent in this State. Curiously enough, the State of Massachusetts (where there is a considerable revenue from licences) shows, under nearly the same regulations concerning divorces as in Maine, the same proportion—viz., 1054 out of 9853. It seems impossible to suppress the liquor traffic in the larger towns. Between the Maine laws and the high licence system is an intermediate system, local option. According to this, it is left to the citizens of a village, town, city, or a larger district to vote for local prohibition. This system seems to work somewhat better than the Maine laws, and it may prove useful in rural districts, the control in small communities being more easily carried through; but in larger towns it is probably ineffective, tempting as it does to a surreptitious liquor traffic. The third system—high licences—has been introduced in several States. Under this system licences for the sale of liquors can be taken out, but the fees are so considerable (for instance, 500 or 1000 dollars yearly) that many small saloons disappear. In some cases the sale of liquors through grocery stores is entirely stopped (Illinois). This system is reported to work well by reducing the number of drinking saloons, thus lessening the opportunity for drinking. It is maintained that "the high-licence system has thrown the liquor traffic into the hands of a more respectable class of dealers," and that those who pay high licences "help the authorities in the conviction of breakers of the law, under the fundamental principle of self-preservation."[4]

It is also to be recommended to limit the numbers of licences that may be taken out. This is the case with the Dutch law of 1881. Under this law the highest number of

[4] Report on Liquor Traffic Legislation in the United States. Foreign Office, London, 1888, pp. 34-5.

licences in a town with more than 50,000 inhabitants is one for every 500 inhabitants; in places with from 20,000 to 50,000, one licence for 300; and in smaller places one for every 250; and the licence is only given for one year. Though the limits fixed by the Act are very liberal, and seem to be maintained very leniently, it has reduced the number of places where spirits could be had very considerably. Still more effective have been the efforts in Sweden, Norway, and Finland. The numbers of bars have been gradually greatly reduced, especially in the rural districts; and in most of the towns the so-called "Gothenburg system" has been introduced. According to this system, adopted since 1865 in Gothenburg, all or most of the licences in a town are given to a company which is not allowed to pay more than a fixed rate of interest to the shareholders, the surplus being spent for the benefit of charitable institutions or forming part of the municipal income. The result has been a great reduction of the number of bars. In Gothenburg the company in 1865 took out forty licences, but at once reduced the number of saloons to twenty-three. The persons who manage the saloons get a fixed salary for the sale of spirits, and are therefore not tempted to encourage the customers to drinking. Moreover, there is a limitation of the hours during which the saloons are open, and other steps have been taken to prevent abuses. Undoubtedly this system—in connexion with the great diminution of the number of bars in the rural districts of the country—has contributed very much to the conspicuous reduction of the alcoholism in the three countries before mentioned. A very practical expedient is also the prohibition of sale of intoxicating liquors at groceries and similar shops, and this provision ought never to be omitted where steps are taken to limit the number of saloons. And last, not least, it is highly desirable to regulate the opening hours of the saloons. This, as we have seen, is one of the features of the Gothenburg system. In England there is a reduction of the licence fee for those who close early on week days, and in the same country (and, as far as I know, also in Holland) we meet a similar provision concerning the non-opening on Sundays. In some countries the opening on Sundays is altogether forbidden, or at least confined to certain hours. In Norway the sale of spirits is even forbidden from Saturday afternoon till Monday morning. Of course a population must be gradually accustomed to such restrictions, but where this has been the case, as in Norway, provisions like these seem to work very well. Undoubtedly they have contributed not a little to the great diminution of drunkenness in Norway, for it is on Saturday night and on Sundays that the strong liquors gather their richest harvest.

None of the recommended expedients are, of course, quite exhaustive. Every country will show alcoholism and delirium tremens as causes of death whether a high licence or the Gothenburg system is adopted—drunkards will exist even where it is very expensive to get drunk and the opening hours of public-houses are very few. But the combined action of such measures will, at all events, be a great saving of life, a great diminution of misery; and until it has been proved that prohibitory laws (Maine laws) may be carried through without opening the doors for smuggling and other abuses, total abstainers and temperates might well agree in recommending some of the proposed measures, or all of them.

RINGWORM IN ELEMENTARY SCHOOLS.[1]

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IT is seldom that such an opportunity offers itself for the medical man, sanitarian, and educationist to meet on a common platform as is offered by this special Section of the Congress, and it is a matter for congratulation that the Section is presided over by one whose knowledge of elementary education is probably unique. I have therefore availed myself of this occasion to express my views on a certain aspect of a disease of the skin which unfortunately is extremely common in this country. I am unable to produce trustworthy statistics of the proportion of children attending elementary schools who suffer from ringworm, owing to the obvious difficulties of investigation, but I can, from personal experience derived from prolonged observation in the out-patient department in one of the large London general hospitals, and from confirmatory statements of colleagues at other hospitals, vouch that ringworm is far commoner in London than in any of the continental cities with which I am familiar. Although it is not my intention to dwell upon the medical side of the question at any length, it is yet necessary to say a few words about the nature of the disease in order to elucidate the subject.

Microscopic examination, cultivation and inoculation experiments, incontestably prove that all the phenomena of the disease, however varied in their clinical manifestations, are due to a fungus which invades the upper layers of the epidermis. This fungus consists of mycelium, representing the mature elements, and spores—so to speak, the seeds,—which latter, either by personal contact or through the medium of the atmosphere, are capable of transplanting the disease on a suitable soil. The extreme contagiousness of the malady, which is familiar to everyone, is thus accounted for. Many of the perplexities which arise are due to the difficulties in recognising its earlier manifestations, which are too often regarded, both by parents and school authorities, as merely "scurfy heads." The same remark applies very often to the disease in its later stage, when cure is supposed to have been effected. When ringworm attacks the body it is quickly and easily eradicated, as the fungus lies quite near the surface; it is therefore only with ringworm of the scalp that I am concerned in this paper. Here its obstinacy to treatment is due to the anatomical fact that the fungus is present, not upon the surface of the skin only, but also around the roots of the hairs in the deep hair sacs or follicles. This fully accounts for the difficulty in effecting anything like a rapid recovery, even in most favourable circumstances; while among the poor, owing to indifference, lack of time, and skill, the disease is certain to last for many months, and not infrequently for years. In this respect it shows a marked contrast to all the other contagious skin diseases of children—as, for example, scald head, the itch, and other animal parasitic disorders, which yield quickly to suitable treatment. The question now arises, What is the present attitude of the authorities with regard to the disease? To this no satisfactory answer can be given, as no line of conduct is uniformly pursued.

On the one hand, the schoolmaster who is watchful and zealous as to the physical wellbeing of the children under his charge refuses to admit a child with ringworm to his school; whereas, on the other hand, he who is lax is apt to overlook or minimise the importance of the disease. In both cases, in my opinion, a grievous injustice is committed; for in the former case a child, presumably in good health, is banished from school and all its advantages, both moral and educational, for a prolonged period, at a time of life when these are essential for its wellbeing; in the second case the spread of the disease to other children is inevitable, and the community at large as well as the individual children must suffer. Of these alternatives, from a medical point of view, the former is the only logical course, though its effect must of necessity be a marked diminution in the general standard of national education and the reduction of the educational returns. It can hardly, I think, be questioned that it is the duty of the State to remedy this, and I would suggest the following practical recommendations as the only ones which have suggested themselves to my mind as offering any solution of the difficulty. It is clearly necessary before attempting to cope with the disease that the exact extent and frequency of its occurrence should be estimated. This can only be carried out by means of *systematic inspection*, in order to accomplish which persons should be trained in each school by skilled medical men to make a weekly examination of every child's head. By this means alone trustworthy statistics would soon be obtained. My second recommendation is directed towards the eradication of the disease without interrupting the educational progress of the child. In the more crowded districts, or wherever feasible, special schools ought to be established in which both systematic treatment and instruction could be carried out. In less populous districts a single class-room might be isolated with a separate entrance. If such a system could be enforced, the advantages would be that the education returns would at once show a marked improvement, that the children would no longer be deprived of their just privileges of education, and that ringworm would be materially diminished in this country, if not entirely eradicated.

[1] Read in the Section of Infancy, Childhood, and School Life of the International Congress of Hygiene.

CASES OF SCURVY ADMITTED INTO "DREADNOUGHT" AND SEAMEN'S HOSPITAL FROM 1852 TO 1889.[1]

BY JOHN CURNOW, M.D., F.R.C.P., AND W. JOHNSON SMITH, F.R.C.S.

THE accompanying table speaks for itself. The great diminution in the number of cases of scurvy is one of the most remarkable and important incidents in the history of medicine, and is due to (*a*) the Merchant Shipping Act of 1867,[2] (*b*) the increase of steam shipping, and (*c*) the decline in the number of sailing vessels in recent years. More rapid voyages mean more frequent supplies of fresh food, and thus must eventually lead to the practical extinction of the disease. The vessels engaged in the East Indian trade, many of them old sailing vessels, often making very prolonged passages, still show an unenviable preponderance in their number of cases [204 out of 284], but in the past few years there has been a great improvement even in the vessels trading to these ports. In the consideration of the prevention of scurvy the following points are of the first importance: It is unknown in the Royal Navy; it never occurs in the higher grades of our mercantile marine; the men engaged on board steamships do not suffer from it; neither captain nor first officer has ever been admitted into the Seamen's Hospital with scurvy; it is limited to the ordinary seamen in sailing vessels, and generally after an unusually long voyage—a "disease of the forecastle."

Years.	Cases.	Years.	Cases.
1852	51	1871	24
1853	63	1872	30
1854	124	1873	7
1855	159	1874	18
1856	91	1875	15
1857	77	1876	30
1858	77	1877	24
1859	90	1878	30
1860	77	1879	21
1861	99	1880	46
1862	64	1881	36
1863	86	1882	28
1864	74	1883	15
1865	101	1884	6
1866	96	1885	8
1867	90	1886	5
1868	64	1887	12
1869	31	1888	10
1870	30	1889	2

1864, 1865, 1866, 1867—13 fatal cases. Since 1868—5 fatal cases.

1852–67: yearly average, 88·6. 1869–75: yearly average, 22·1. 1876–82: yearly average, 30·7. 1883–89: yearly average, 8·3.

Patients have been admitted who have regularly taken apparently good "lime juice" for a long period, but whose dietary in other respects was bad; so that lime juice must be considered as only the most valuable adjuvant in the prevention of scurvy, and not as an absolute and complete substitute for a proper anti-scorbutic diet. Meats and vegetables (especially potatoes) can be preserved so as to retain their special characteristics for a much longer period than the longest voyage. In Mr. Leigh Smith's second voyage to Franz-Josef Land in the *Eira*, in 1881, twenty-five explorers, officers and men, remained free from scurvy, notwithstanding the absence of lime juice from their diet, during a sojourn of more than twelve months in the Arctic regions. They fed freely when possible on the flesh of recently killed animals, and the blood was liberally added in the cooking, whilst preserved vegetables were taken with every meal.

[1] Paper read in the Section of Naval and Military Hygiene at the International Congress of Hygiene.

[2] Date of "Merchant Shipping Amendment Act."

ON TUBERCULIN IN RELATION TO SURGICAL TUBERCULOUS DISEASES.

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(*Concluded from page 285.*)

3. *The future of tuberculin.*—Dr. Koch has told us that tuberculin is a glycerine extract of the tubercle bacillus, and that although the remedial principle is not the only substance present, yet that the others are of no importance as regards their action on the body. This is a view which I have never been able to accept. The tubercle bacillus, like other bacteria, must produce its effects by virtue of the chemical products of its growth, and if tuberculin contains everything which can be obtained from the tubercle bacillus by extraction with glycerine, it must contain a variety of substances, some of which may be the agents by virtue of which the organism exerts its pathogenic action. Hence I concluded my paper at the Medical and Chirurgical Society by expressing a hope that when the efforts to isolate the remedial substance had proved successful, it would be found that a good deal of the objectionable action of tuberculin had been got rid of. This supposition was much more speedily confirmed than I had expected. Two days after reading that paper Dr. William Hunter came to me and told me of work which he had been doing in the way of analysing Koch's fluid, and studying the action of the substances obtained on certain of the lower animals. He asked me to assist him in testing the effect of some of these substances on tuberculous guinea-pigs, and, in the event of any of them showing a special remedial action, to employ them in treatment, and since that time we have been engaged in making observations in this direction. Dr. Hunter has already recently given an account of his work in the *British Medical Journal*, and I shall therefore only refer to our observations as to the action and remedial value of the substances used: in what I say I express our joint opinions.

If tuberculin is dropped into absolute alcohol a heavy precipitate falls, while certain substances remain in solution; the precipitate may be designated by the letter *A*, the filtrate by the letter *C*. According to Dr. Hunter the precipitate *A* consists for the most part of proteid materials, with, in addition, traces of glycerine, colouring matter, and a small quantity of salts. The filtrate *C*, on the other hand, contains the great bulk of the salts present in tuberculin along with a small quantity of proteid material. Both of these substances were found to possess certain remedial properties.

We have treated several patients with the filtrate *C* with results which I shall state immediately. In the first place, however, I may mention that it causes the elevation of temperature typical of Koch's fluid, but without any noticeable local inflammatory action; this is best seen in man. If a dose of *C* corresponding with from two to five milligrammes of tuberculin is injected into a patient suffering from lupus, we find that, after the lapse of about six hours, the temperature begins to rise rapidly, even reaching 104°, and then falls again in a few hours. In two cases this elevation of temperature was preceded by a rigor, and is accompanied by slight headache and drowsiness; but there is no nausea, pains in the limbs, &c.—in fact, none of the general depressing effects characteristic of tuberculin. If now the administration of this substance is continued, we have, as with tuberculin, a repetition of the pyrexia. This gradually becomes less marked, and ultimately entirely subsides, although the temperature may be somewhat irregular for some time. As regards the effect on the lupus itself, there is, as I have said, no noticeable local inflammatory action, but increased scaling takes place, and if the treatment is continued the lupus patch gradually dries up and becomes depressed. This was especially well marked in the first case in which we used this substance. This was the case of a boy aged eighteen, who had a large patch of lupus on the right cheek, with a small ulcer in the middle, a thickened edge, and nodules round the edge. The lupus had also spread on to and involved the whole ear, and the lobule of the ear was greatly œdematous, hanging below the angle of the jaw, the œdema being evidently due to pressure on and blocking of the lymphatics.

Towards the upper and back part of the ear there was an ulcer laying bare the cartilage. There were also numerous lupus nodules over the soft palate and in the upper part of the larynx, but without ulceration (see Chart II. in Dr. Hunter's paper). After this patient had been treated with *C* for about three weeks the ulcer on the cheek had healed, the previously thickened edge had become depressed and the separate nodules were less marked; at the same time the lobule of the ear had very distinctly diminished in size. At the present time the improvement both as regards the face and the palate is very considerable. We also treated four other cases for some time with this substance, one a case of scrofuloderma, and three cases of joint disease with sinuses. In some respects there was improvement in the case of scrofuloderma, and in one case where there were sinuses in connexion with disease of the spine and knee-joint, but in the other two cases with sinuses we cannot say that there was any alteration. We did not, however, go on long with *C* in the latter cases, and we have not pushed the doses as we would have done with tuberculin, the usual dose given being equivalent to five milligrammes of tuberculin twice daily. We soon came to the conclusion that though this substance possesses certain remediable properties, it is objectionable on account of the pyrexia which accompanies its use at first, and also because it seems to contain something which is antagonistic to its remedial action.

Accordingly Dr. Hunter set to work to separate the salts from the proteid materials, and we then found that the remedial substance resided in the proteid, while the temperature-producing substance had been lost in the process of removing the salts. Tuberculous guinea-pigs have been treated with the pure alkaloidal salts, but have shown no improvement; on the contrary, the disease has steadily progressed, and apparently more rapidly than if it had followed its natural course. With this fact before us it was evident that it was not desirable to employ this substance in treatment. Having arrived at these conclusions, we substituted the proteid, which Dr. Hunter considers to be practically a pure albumose, and which we may designate *C B*, for the filtrate *C* in most of the above cases. We have also commenced the use of *C B* from the first in a case of lupus of the face and nose in King's College Hospital, and a case of lupus of the thigh and neck and one of synovial disease of the knee-joint, without suppuration, in Paddington-green Children's Hospital. These cases have only been under treatment for three weeks, and we cannot, therefore, say much about them at present. In the first case of lupus, a woman aged fifty, the tip of the nose had been destroyed, and there were ulcers on the remains of the nose and the upper lip, and also ulcerating patches on the cheek, with a number of discrete lupus nodules. During the treatment most of the ulcerated patches have healed, and the nodules are somewhat less visible. After the first injection in this case (the amount being equivalent to five milligrammes of tuberculin) there was slight redness of the patches on the cheeks, and lately, when we increased the dose up to 0·012 three times a day, there was a little swelling of the patches, and distinct redness around them for about half an inch (see Chart V. in Dr. Hunter's paper). The improvement is most marked in the child at the Paddington-green Children's Hospital, where there was a large patch of hypertrophic lupus on the back of the left thigh. In this case we pushed the remedy so that in the course of a week we got up to 20 milligrammes thrice daily, but beyond somewhat increased fleshiness of the lupus at first there has been no sign of local inflammatory reaction, nor any general disturbance. The surface of the lupus is now paler in colour, with no granular appearance, and level with the surrounding skin. In the third case, that of synovial disease of the knee, the joint, which measured one inch more than the other at the level of the lower border of the patella, has now decreased three-sixteenths of an inch, and there has been no pain or other evidence of local inflammation. In this instance the original dose of five milligrammes twice a day has been adhered to. The presence of the slight local reaction in the first case and the increased succulence of the lupus in the second are interesting as compared with the action of solution *C*, where no signs of inflammation were present. This, taken along with other circumstances, seems to imply that the alkaloidal salts or some other substance lost during the preparation of *C B* from the solution *C* exercise a restraining influence in this respect. As regards the general effect of *C B* in these cases, there has been no fever or general disturbance after the injections; the highest temperature even in the child, where the doses were rapidly increased, having only on three occasions been just above 100°, the average, however, varying between 97·4° and 99·4°. This elevation of temperature seems to imply that in these specimens of *C B* the temperature-producing material had not been altogether got rid of. It is possible also that these albumoses may cause slight pyrexia when the initial dose is large or is rapidly increased. This is not, however, their characteristic action. The remedial action of this substance, though distinct, is decidedly slower than that of the materials to which I shall immediately refer. In order to obtain the improvement mentioned above, we have found it necessary to steadily increase the amount administered, and this may be due in part to the fact that a considerable portion of the total *C B* present in tuberculin is lost in the method of preparation and in part to the absence of the initial inflammation.

Leaving the filtrate *C*, let us now turn our attention to the precipitate *A*. If a dose of *A* equivalent to 1 or 2 milligrammes of tuberculin is employed, the patient has all the depressing effects characteristic of Koch's fluid: the nausea, vomiting, pains in the back and limbs, weak action of the heart, &c., and, at the same time, the typical local reaction—viz., redness of and around the part, swelling, and exudation. As regards the temperature the results have been somewhat variable (see Chart I. in Dr. Hunter's paper). It usually rises a little, and sometimes considerably; but as a rule this rise occurs at a later period than after the injection of tuberculin or of the filtrate *C*, and is probably partly dependent on the degree of local inflammation and partly, and probably mainly, on the amount of the temperature-producing substance carried down with the precipitate. The temperature is not, however, the characteristic feature of the action of this material as it is of solution *C*; what is so characteristic of *A* is the general illness and the local reaction. If now the injections are continued, tolerance is gradually established, both as regards the local and general reaction. In fact, *A* acts in a very similar manner to tuberculin, with the exception mentioned above, as regards the pyrexia. We have only continued this material in three cases. The first was the case of a girl aged nineteen, with extensive lupus of the face, neck, and palate, ulcerated in several places. This patient has been under treatment since June 8th, and has very distinctly improved. All the ulcerated patches have healed, and although lupus tissue is no doubt still present, the whole appearance of the part is markedly better, the result being very much the same as one would probably have obtained with tuberculin itself. The second case, one of scrofuloderma, also improved considerably at first without, curiously enough, any general or marked local reaction, but it has of late made no progress. The third case was that of a septic sinus connected with spinal disease, and here there has been no noticeable benefit.

It was evident from our experience that there was a certain amount of the remedial substance present in *A*, but it had associated with it the substances which caused the inflammatory and depressing and, indeed, all the bad effects of Koch's fluid, and it was clear that in it we had nothing better than tuberculin itself. As all the facts pointed to the view that the remedial substance was an albumose, Dr. Hunter proceeded to obtain the total albumoses present in tuberculin in the manner which he described; the solution of these albumoses we shall speak of as *B*. We have employed *B* in treatment, and so far with satisfactory results. This substance, even in an initial dose corresponding to five milligrammes of tuberculin, produces no general effect; there is no sickness, nausea, pains in the bones, or depression such as is caused by tuberculin or by *A*. Nor is there any elevation of temperature unless local action is severe, when there may be a slight secondary rise, such as occurred on one occasion in the first case. But after the first injection, and sometimes after the second and third, there are marked local redness and swelling, in fact, the local reaction of tuberculin. We have used this substance from the first in two cases, and in both there is distinct improvement. One was a case of extensive lupus of the neck and face with ulceration, in a woman aged forty-seven, which has now been under treatment since June 17th, the dose which was at first two milligrammes being gradually raised to ten milligrammes

thrice daily. In this case the ulcers have healed and the condition of the face and neck has considerably improved, with a total absence of bad symptoms. After the first injection there was marked local reaction, and the temperature rose to over 101° in from twenty-four to thirty-six hours later, but at once fell again; since that time it has not risen above the normal (see Chart III. in Dr. Hunter's paper). The other case was that of a child upon whom I performed arthrectomy of the hip in spring, removing a sequestrum from the neck of the femur and clearing out a large abscess, and where after healing had taken place the greater part of the anterior scar broke down. At the time when the administration of this substance was commenced—viz., on July 3rd—the wound was looking unhealthy and typically tubercular. After the first injection (see Chart IV. in Dr. Hunter's paper) there was considerable redness around the wound; in a very few days the sore lost its unhealthy appearance, became covered with healthy, rosy granulations, and is now almost healed. Two other cases with sinuses have since been put on *B*, and are also improving.

If now we summarise these facts, we find that all the substances which we have used—viz., *C*, *C B*, *A*, and *B*—have a certain amount of remedial action, but some of them have also very objectionable properties. Thus *C* leads to improvement in a very satisfactory manner—viz., by gradually drying up and dwindling away of the tubercular tissue. The objections to *C* are, however, the presence of a temperature-producing substance, and probably also of one which is opposed to the remedial action. These injurious substances are got rid of in the process of dialysing the material as described by Dr. Hunter, and in the substance left—viz., *C B*—we have a certain amount of remedial action without the objectionable symptoms. *A* has also a certain tendency to produce improvement, but it causes very serious general disturbance, violent local reaction, and probably all the bad effects of tuberculin. By obtaining the total albumoses pure as in *B*, we get a material which does not cause any general disturbance or, so far as we have seen, of itself raise the temperature, while it produces local reaction and subsequently distinct improvement.

It is clear that neither *A* nor *C* is suitable for practice; but that, on the other hand, the remedial substance is present in *B* and *C B* in a condition, so far as we have as yet observed, free from the objectionable properties of tuberculin. In the albumoses *B*, as prepared by Dr. Hunter, we have a substance which has been freed from the temperature-producing agent and from that which causes the depression and illness. Whether at the same time the substance which predisposes the body to relapses, if such a material exists separately, is also lost we cannot as yet say, but we think it probable that the main part of this action resides in the alkaloidal salts themselves, or in some other substance removed along with them. Our chief reason for this view is the fact previously alluded to, that when these substances were employed in the treatment of tuberculous guinea-pigs, the disease seemed to progress more rapidly than in others not so treated. In *B*, however, we still retain the substance which produces the local inflammation, and there are circumstances, especially in connexion with internal tuberculosis, in which this inflammation is most undesirable. On the other hand, in external tuberculosis the transient acute inflammation in the first instance is sometimes a good thing, and that there are certainly cases in which *B* will be of greater use than *C B* for this very reason. Where no primary inflammation is permissible, we have in *C B*, a substance in which this has been reduced to a minimum, and from which, as far as we can judge, all the other hurtful properties of tuberculin can be removed. The disadvantage of *C B* is that, as compared with *B*, it has a much slower remedial action, and this is no doubt partly due to the absence of the primary inflammation, and partly also to the fact that a considerable amount of this substance is lost in the present method of preparation. Dr. Hunter is of opinion, however, that a much larger quantity of *C B* may be obtained by another method of preparation, which he is at present working out. In these remarks as to the action of these various substances we have, of course, only pointed out the broad characteristics. There is no doubt that as more cases are treated various idiosyncrasies will be found, just as in the case of tuberculin, and, as we have noted, for example, in regard to *A*, where one of the cases did not show the illness or temperature characteristic of that substance.

At present we can, of course, only speak of the more or less immediate action of these albumoses, and we do not wish to raise any hopes or express any opinion as to whether the improvement which occurs in the first instance will be permanent; that is a matter for further and more extended experience. What is of importance is that in these solutions the hurtful agents in tuberculin have apparently been removed.

It may naturally be asked, in conclusion, what are my views as to the relation of these facts to the treatment of surgical tuberculous diseases? On that matter I can only express a provisional opinion, but, so far as I can judge, I think that the solutions *B* or *C B* should be employed in future in place of tuberculin itself. In my paper at the Medical and Chirurgical Society I mentioned certain cases in which tuberculin, in spite of its disadvantages, really promised to be of use, and in these circumstances I should now employ *B* or *C B*. These were cases of intractable and extensive lupus, where this substance would be used in combination with other measures, and of disease of bones and joints after operation, where healing does not occur, or where the whole disease has not been removed. How far it may be of use in the cases in which I said that the employment of tuberculin was not advisable must be decided by experience, but I am inclined to think that it can be employed with advantage in some of these cases, and that the conclusions drawn from the action of tuberculin itself may have to be somewhat modified. For example, in genito-urinary tuberculosis I came to the conclusion that tuberculin was too dangerous a remedy to use, but I now think that in some of these cases where operative measures cannot be adopted it would be only right to employ *C B*, perhaps changed after a time for *B*; at any rate, I do not think that any harm would result.

The decision as to its exact place in surgery will depend very much on whether it turns out that the early improvement is more or less permanent, and on whether it is obtained fairly rapidly. In our surgical work we aim at, and can hope for, in many cases, a more or less speedy and satisfactory cure, if not by general treatment, then by operative interference; and unless these substances will produce a rapid and permanent result, they can only have their place in cases where our other means are unable to effect our purpose. For example, no surgeon would dream of subjecting a patient with a small or even moderately large patch of lupus in certain situations to an injection treatment which must last for months, when by means of the knife he can cut out the disease and close the wound by stitches or skin grafts; on the other hand, where the lupus affects parts more or less inaccessible to satisfactory surgical treatment, while one would get rid of as much as possible in that way, these substances would be of very great assistance in bringing about the arrest of the disease. Thus, in surgery this treatment will probably take a place secondary to the more rapid and thorough operative measures. In medicine, on the other hand, I cannot but think that the result of getting rid of the noxious constituents of tuberculin will be to place this treatment in a prominent position among the means at the disposal of the physician, and I look to the work of physicians for the final determination of the place which these substances shall occupy in the list of remedial agents for tuberculosis.

Welbeck-street, W.

Reviews and Notices of Books.

Études sur les Écrits Inédits des Anciens Médecins Grecs. Par le Dr. GEORGES A. COSTOMIRIS, Professeur Agrégé d'Ophthalmologie et d'Otologie à Athènes. Paris: Klincksieck. 1890.

BRITISH scholarship is largely indebted to that of Germany, not only in grammar and lexicography, but also in the constituting of texts and in critical commentaries on the same. There is, however, one department of classical learning in which not only British but German scholarship has much to gather from another nationality, and that is the medical literature of ancient Greece and Rome, in which the contemporary world has been laid under the deepest obligations by France. No country in the Europe of

the nineteenth century has produced so many physicians who were also Hellenists and Latinists, and who have employed their twofold learning—professional and classical—to such good effect in reclaiming the old masters in medicine from the neglect that either kept them unedited or allowed them to appear in faulty editions and in no less faulty interpretations. We have but to name the "Hippocrates" of Littré, the "Rufus" of Ruelle, the "Oribasius" of Daremberg, and the "Celsus" of the last-named scholar and Vedrènes, to remind our readers of the poverty of British and even of German scholarship in a field which our French neighbours have worked so laboriously and often, it must be confessed, so thanklessly.

Naturally enough, it is in the Greece of to-day that this reverential study of the medical fathers has been most promptly appreciated and loyally responded to. Moustoxydes, Minas, Reinhold, and Anagnostakis have honourably distinguished themselves in the wake of Littré and Daremberg, and now we have Dr. G. A. Costomiris, professor of ophthalmic and aural medicine in the University of Athens (favourably known by the first volume of his History of Ophthalmology and Otology among the ancient Greeks), coming again to the front with one of the most interesting and fruitful contributions recently made to medical literature—an enumeration of the yet unpublished writings of the ancient Greek physicians and surgeons, as well as of those writings of which the original text has been lost, but which exist in Latin or Arabic versions. The Bibliothèque Nationale of Paris—the field from which Littré and Daremberg had already come laden with such *spolia opima*—has, with its unrivalled array of ancient medical manuscripts, been also the scene of Dr. Costomiris' labours, extended, moreover, to the Bibliothèque de l'Académie de Médecine and to the other European libraries—to wherever, in short, there was a text to be collated or a rare edition to be examined.

Wordsworth has immortalised the Hellenist's joy on discovering some "tender-hearted scroll of pure Simonides," and a kindred feeling must often have been shared by Dr. Costomiris on alighting on some codex dimly anticipated, but never to be really grasped except in some unexplored library, by a Palinurus like himself, who

> "Was the first that ever burst
> Into that silent sea!"

In these profoundly interesting pages we contract something of the enthusiasm with which he scans for the first time, doubtless, since the revival of letters, the original treatise or the eclectic compilation of many a Greek physician or surgeon whose name has hitherto been all that posterity has known of him. Other such moments there are when we find him laying a triumphant finger on a manuscript that supplies a long missing link in the chain of Greek medical doctrine; and, again, we share his delighted surprise when he seizes on a codex which enables him to vindicate for a Greek author the literary child for whom another paternity had been claimed. All this, we repeat, makes Dr. Costomiris' work most fascinating in the perusal, abounding as it does in the fine "special sense," the *tactus eruditus*, of the finished philologist and scholar. But there are other attractive points in his "Études" which have a more than literary or even historical interest.

Not only do we find confirmed what his compatriot, Professor Anagnostakis of Athens, has already proved in his masterly treatise on Antiseptics as known to the Ancients, that the "méthode d'asepsie," for example, was in common practice in the Greek schools, but we get suggestions of treatment which are well entitled to reconsideration, and even to adoption, at the hands of posterity. Just as Daremberg, in the well-known preface to his "Celsus," points out that very little in the way of supplement would make the treatise "De Medicina" a useful compendium of modern practice, so Dr. Costomiris lets us see that much in the Greek therapeutics might be rescued from the unwise desuetude into which it has fallen. "La médecine," he says, "au point de vue thérapeutique, n'a pas encore utilisé toutes les sources que nous ont léguées les anciens; elle n'a pas encore expérimenté suffisamment tous les médicaments et les méthodes recommandés avec tant d'ardeur par les plus grandes autorités de l'antiquité. L'expérience clinique sur les procédés thérapeutiques anciens peut nous révéler, j'en suis sûr, de vrais trésors." It is only an experience similar to theirs which can definitely teach us what we must reject and what we should retain; and in this connexion he quotes the memorable words of Galen when speaking of Hippocrates: "I take neither Hippocrates nor the other masters of antiquity on their word merely; but I check what they have laid down by my own experience and my own reasoning, and so determine whether it is true or false." And again he quotes the same philosophic physician, once more referring to the father of medicine: "I do not accept this man [Hippocrates] on trust, as so many others do; but I admit his testimony because I see his demonstrations to be sound."

> "Multa renascentur quæ jam cecidere, cadentque
> Quæ nunc sunt in honore,"

is as fair a principle in medicine as in philology.

Sharing Dr. Costomiris' view that medical literature has sustained few greater losses than the frustration of Dr. Daremberg's "plan gigantesque de la collection des médecins grecs et latins," and looking with him for the realisation of that noble project to division of labour on the part of medical scholars of all countries, we hail his researches as a "path-breaking" contribution to an enterprise which only the next century is destined to see completed. We would point to his eighth chapter—that on Aëtius (*floruit circa* A.D. 500)—as, perhaps, the most important part of his present treatise, considering the unique value of that author's remains, and also the fact that of the sixteen books composing them, the greater part has yet to be published in the Greek original. All that was most sound in the medicine that preceded him Aëtius has sifted out and presented to us—drawing largely on Hippocrates, Dioscorides, Rufus, Aretæus, Archigenes, Soranus, Herodotus, Leonides, Philomenus, Philagrius, Posidonius, and, above all, on Galen and Oribasius, the whole forming that famous "Synopsis" which Photius declared superior to all other compilations of the kind and which the great Boerhaave—himself a pioneer of modern clinical research—pronounced to be for medicine what the Pandects of Justinian are for law. An entire edition, such as Dr. Costomiris could give us, of this "Synopsis" would indeed be a boon to medical literature, and we trust that no official timidity, such as deterred Dr. Daremberg from his grand undertaking, will intervene, on the part of the Greek and French Governments, to withhold from him the necessary facilities for the work. Two scholarly German physicians, Drs. Weigel and Dietz, conceived the project—which formed part of Dr. Daremberg's—of giving the world a perfect edition of Aëtius. In both cases their honourable labours were cut short by death. It seems reserved for a distinguished professor of the University of Athens to win for his country an honour to which Germany and France have severally aspired—all the more that he has just afforded proof in the present treatise that in professional knowledge, in classical learning, and in special palæographic experience he combines in a higher degree than his predecessors the qualifications indispensable for the enterprise.

Einführung in das Studium der Bakteriologie, mit besonderer Berücksichtigung der Mikroskopischen Technik. Von Dr. Med. CARL GÜNTHER. Leipzig: Georg Thieme. 1890.

IN the book before us are found many of the good points, and certainly many of the bad ones, of a German book.

We suppose that as it is necessary that everyone who aspires to the work of academic teaching in a German University should write a book, and that, as there are some twenty-one universities in which the teaching is conducted in German, we should not grumble that so many works, covering almost identical ground, and treating subjects in almost the same fashion, should emanate from the pens of young German writers and scientific workers. If ten good men who have any chance of obtaining professorial appointments are trained in any one school, we are pretty sure to have eight or ten versions of the methods of working in that school, and Dr. Günther has now provided us with about the penultimate volume of his series.

In writing this we do not wish to cast any reflections on the book itself, or on the erudition and thoroughness of the author, but we cannot help feeling that much of what he has set down has been equally well said in the numerous text-books on bacteriology that have appeared in Germany in recent years, and it is rather disappointing to find that the author has stuck so closely to the models of his predecessors, so that the reader might almost imagine, if the differences of style and language be ignored, that he was again immersed in Hueppe or Fraenkel. It is of course natural that this should be the case when men have in their mind's eye an ideal method of teaching, the method of a revered master that has succeeded so well, a method that in their hands they feel could scarcely be improved upon. Had Dr. Günther's book appeared before Dr. Fraenkel's we should have received it with open arms; whilst under existing circumstances the work cannot but be looked upon as one, very good in its way, but one that takes up little new ground, fills no gaps, and supplies no felt want. This is probably the result of the author having kept within the limits of his own observation in dealing with his subject (from which it arises that what he writes is worth reading, as he is giving the result of his own experience, and the impression is always conveyed that where Dr. Günther recommends a method he has tried it and found it to succeed well.

However, the book does not pretend to be more than an introduction to the study of bacteriology, and must be judged as such; and, independently of other books, it may be recommended as being generally accurate and very thorough. It is divided into the usual chapters on the general morphology of bacteria, the physiology of nutrition, the methods of bacterial research, microscopic and cultivation methods, and the methods of examination of air, water, and soil. In connexion with the various methods a good feature, especially prominent in the section on staining, is that the author not only gives detailed descriptions of the method of procedure, but also describes the *rationale* of the various processes, a feature which in too many works is dealt with in the most unsatisfactory manner. Then bacteria as the causal agents in the production of specific infective diseases are described, and the usual list of pathogenic bacteria is gone through, as well as the various forms of such organisms. The appearances of naked-eye growths and of microscopic preparations are fairly well given. A short appendix on the pathogenic mould fungi and the pathogenic protozoa, especially that met with in malaria, follows. In a very brief section on non-pathogenic or saprophytic bacteria Dr. Günther groups the organisms in a manner somewhat different from that adopted by many other authors; for example, he keeps a separate heading for the bacteria of the buccal cavity, the micro-organisms that give rise to the urea fermentation, and has also a separate heading for the various forms of proteus. Then follows an appendix, which, however, in this instance, occupies only a single page, three-quarters of which is devoted to the mould fungi and a quarter to the mention of a few yeasts. Ten plates, containing six photographs each, are exceedingly well reproduced, some of them being quite equal to anything that has yet been published, even in special photo-micrographic works. The book is very well printed, is on capital paper, and is an improvement on many text-books in that it gives full references to the original papers in which the various methods are described.

Hypnotism. By FRANCIS R. CRUISE, M.D. Univ. Dub.

DR. CRUISE has published in pamphlet form his recent address before the Irish Academy of Medicine, and the fact that it has rapidly attained to a second edition shows the general interest that the subject is exciting. Dr. Cruise has studied the question carefully and practically at Nancy under the tuition of Liébault and Bernheim, and at Paris under Luys, Voisin, and Guinon (chef de clinique to M. Charcot), with the result that he has become a thorough convert to the new doctrines. He points out what is the essence of the modern theory of hypnotism—viz., the suggestion of cure, the induced sleep of hypnotism being only important as rendering suggestion infinitely more powerful than in the waking state. According to Dr. Cruise the method adopted by Liébault at Nancy is as follows:—The subject is made to stare at two of the operator's fingers, and as soon as the eyes begin to water and the pupils to dilate he suggests "sleep" in an emphatic manner, and then closes the eyelids, gently pressing the eyeballs. In nearly every case, we are informed, the patients pass into sleep of varying degrees, and to all it is suggested verbally that on awakening their symptoms will be improved, the seat of disease being at the same time strongly rubbed. Although the patients were sufferers from chest affections, heart disease, dyspepsia, uterine ailments, locomotor ataxy, paralysis agitans, writer's cramp, and other grave ailments, Dr. Cruise assures us that all professed either relief or cure from the foregoing procedure. Two reflections naturally suggest themselves: First, what value is to be attached to *the subjective conviction of cure or relief* felt by the patients; and secondly, to what extent it would be possible for even a skilled observer such as Dr. Cruise in the course of a brief visit to master and test the evidence necessary to establish the fact of even a single cure. In reading such accounts we are constantly struck with the failure of our informants to satisfy the strict rules of evidence. In order to establish the fact of a "cure," we need the following chain of evidence: (α) The physical signs and clinical history establishing the diagnosis; (β) proof that the case in question is not one tending to a spontaneous cure without treatment; (γ) particulars of the therapeutic measures employed; (δ) immediate results; (ε) ultimate history of the case. How seldom are these simple and obvious rules strictly observed. It would appear from Dr. Cruise's account that Liébault uses hypnotism, and hypnotism alone, for each and every ailment, a fact that does not impress us favourably. Bernheim, on the other hand, simply adds hypnotism as an adjunct to other therapeutic agencies. He uses it to relieve the insomnia of pneumonia, the pains of rheumatism, the cough of phthisis, neuralgia, functional paralysis, convulsions, dipsomania, &c. He does not for a moment suggest that hypnotism can cure organic disease, but holds "that the special field for treatment by hypnotism is non-organic functional disease." M. Bernheim seems to rely entirely upon "suggestion" as the means of inducing hypnosis, simply commanding his patients to sleep. Dr. Cruise believes that this method is insufficient except in very experienced hands, and that it is usually necessary to *tire out* the patient's senses in some way, either by a monotonous stare at a bright object, or by listening to a continued sound. At Paris a somewhat different hypnotic doctrine and practice exist. "The school of M. Charcot leans strongly to the idea that hypnosis is a neuropathic state, including that imperfectly defined group of conditions

termed hysteria, while the Nancy professors deny this in the main. ..... Again, while the Nancy professors hold a very strong view as to the possibility of hypnotism being used for criminal ends, and with success, the Charcot school differs from them, and rather sneers at what it terms "Les crimes du laboratoire." M. Luys relies mainly for producing hypnosis on "fascination" by a rotating mirror. Among the cases of apparent cure that most impressed Dr. Cruise in the various Paris schools were cases of spastic paralysis, maniacal delusions and violence, dipsomania, &c. He discusses the various objections that have been raised to the practice of hypnotism and combats them. He thinks most of them are met by the three rules laid down by Bernheim: (1) Never hypnotise any subject without his formal consent, or the consent of those in authority over him; (2) never induce sleep except in the presence of a third person in authority, who can guarantee the good faith of the hypnotiser and the subject; (3) never give to the hypnotised subject without his consent any other suggestions than those necessary for his cure. In reply to the objection that hypnotism is useful only in affections of the nervous system, Dr. Cruise says: "My reply is simple. In the first place, it is *untrue;* and secondly, *if it were true,* it would bear strongly in favour of hypnotism, because these very ailments are avowedly the most rebellious to ordinary medical treatment." He sums up the entire question as follows: "Satisfied as I now am that hypnotism is a reality, a great means towards cure, one which can never be crushed by ignorant and baseless criticism, I believe that it is our duty—imperative duty—to do it justice and rescue it from the hands of charlatans. *As we use it, it will be good or evil.*" We submit the above facts and arguments to our readers without at present attempting to adjudicate upon a most difficult and complicated question.

OUR LIBRARY TABLE.

Transactions of the Sanitary Institute. Vol. X. Congress at Worcester. London: Edward Stanford. 1890.—The volume before us is well printed, has a good index, and contains many useful papers. We find the rules and regulations that govern the British Sanitary Institute and a summary of the work this organisation has accomplished. Then follow all the more important papers read at the Worcester Congress, and a summary of the discussions which they occasioned. These comprise a paper by Dr. W. Strange, medical officer of health, which gives a very favourable account of the progress accomplished at Worcester. The people used to drink the water of soil-polluted surface wells. In one part of the town 3145 persons lived in 1656 rooms. Now there are sewers, a water-supply, less overcrowding, and the death-rate, which was 25·5 in 1872, was 18·74 in 1888. The zymotic death-rate was 3·9 from 1874 to 1878, and it fell to 1·88 from 1886 to 1889. Dr. John T. Arlidge gives interesting details on the dangers of the pottery trade. There are many other papers that deserve mention. Most of them are terse and full of information, and the Institute has very properly made a feature of sanitary questions in India. Under our *régime* it would appear that 38,000,000 persons have died during the last ten years in India from preventable diseases. It is strongly urged that better knowledge of sanitation should be inculcated among all the English officials who govern our Eastern empire. On food, on gymnastics, on ventilation, on epidemic diseases, &c., there are papers, followed by discussions; and, altogether, the volume contains much that is of interest to the sanitary reformer.

Archives de Physiologie. Edited by BROWN-SÉQUARD. Sér. V., Tome III., No. 2. April, 1891.—The chief memoirs in this number are—(1) a Contribution to our Knowledge of the Cervical Region of the Great Sympathetic Nerve in the Solipede, by M. Arloing; (2) on Muscular Rhythm in the Contraction produced by Cortical Stimulation, by N. Wedenski; (3) on the Mechanical Action exerted by Antagonistic Muscles in the Acts of Locomotion, by G. Demeney; (4) Researches on the Causes of the Toxic Action of Normal Urine, by MM. Mairet and Bosc (these observers attribute the toxic action of the urine essentially to the colouring matters aided by the potassium salts); (5) on the Glycogenic Function of the Liver at the Time of Death, by L. Butte; (6) on Hypnotism in Frogs, by D. E. Biernacki; (7) on Lupus Vulgaris Erythematodes, by Professor Leloir; (8) Experiments on the Sensations of Cutaneous Traction and Pressure, by A. M. Bloch; (9) on Electric Regulators for Speed, by D'Arsonval; (10) Contribution to our Knowledge of the Action of Nicotin on the Circulation, by MM. Wertheimer and Colas; (11) Theory in regard to Purkinje's Images, by M. Tscherning; (12) Experimental Researches on the Poison of the Arrows of Tonkin, by MM. Boinet and Hédon (they believe it to be the upas asitian); (13) a Method of Rapid Filtration and Sterilization of Organic Liquids, by M. D'Arsonval.

The Journal of Physiology. Edited by MICHAEL FOSTER, F.R.S. Vol. XII., No. 1. April, 1891.—This Part contains the following Memoirs—1. The Action of Alcohols and Aldehydes on Proteid Substances, by T. Lauder Brunton and Sidney Martin. 2. Physiology of the Communicating Branch between the Superior and the Inferior Laryngeal Nerves, by W. Howell and G. C. Huber. 3. The Relative Formation of Proteoses and Peptones in Gastric Digestion, by R. H. Chittenden and J. A. Hartwell. These experiments prove that the formation of proteoses precedes that of peptone, and that they are truly primary products of gastric digestion. 4. The Primary Cleavage Products formed in the Digestion of Gelatine, by R. H. Chittenden and Fredk. P. Solley (Yale University). 5. Myosin Peptone, by R. H. Chittenden and Ralph Goodwin (Yale University). 6. Composition and Action of Peptonised Milk, by P. Horton-Smith. 7. The Influence of Bile on the Fat-splitting Properties of Pancreatic Juice, by B. K. Rachford (Ohio). 8. The Proteids in Milk, by John Sebelien.

THE BRITISH MEDICAL ASSOCIATION.

AT the third general meeting of the Association an address on the Evolution of Local Sanitary Administration was delivered by Dr. EDWARD SEATON, Lecturer on Public Health at St. Thomas's Hospital and Medical Officer of Health for the Administrative County of Surrey. After briefly sketching the rudimentary condition of sanitary administration before the passing of the Public Health Act in 1872, he described the effect of that Act in extending the sphere of medical and scientific influence in sanitary administration. That influence had been of incalculable advantage to the public health. Under the Act of 1872 certain large towns, notably in the north and in the midlands, had appointed medical officers of health of a kind altogether different from the occasional sanitary referees who had preceded them. The health officers of the new creation were skilled advisers, whose chief function it was to exercise a continuous pressure on the authorities whom they served in all matters pertaining to the health of the community. The most important result of that influence was seen in the local Acts defining the conditions under which new buildings could be erected, which had been obtained by several large towns between 1873 and 1878. These Acts not only improved the health of the towns to which they related, but led to the promulgation of the complete "Model By-laws of the Local Government Board," which were now being adopted throughout the country. With the view of giving effect to these regulations, some "pioneer" corporations had appointed a special building surveyor, who should be responsible, jointly with

the medical officer of health, for the enforcement of the by-laws. An illustration at once of the far-reaching effects of local legislation and of the influence of medical advice on local authorities was afforded by the Notification of Infectious Diseases Act, which was first introduced by the Town Council of Bolton in Lancashire in 1877. The great advantage of notification was that it enabled sanitary authorities to combat the *actual* as well as the *potential* causes of disease; for instance, by tracing an outbreak of infectious disease to a particular water-supply. It could only be useful, however, when the immediate causes of the diseases notified were accurately known and amenable to control, and it could not produce any very remarkable results in checking the spread of such diseases, unless it were complemented by the provision of an efficient sanitary staff and of adequate means of isolation in special hospitals, together with disinfection. The former of these requirements was a matter of administrative policy which was hardly yet ripe for discussion. With regard to hospital accommodation for cases of infectious disease, the needs of a large town, and the way in which they might be met, were exemplified by the work of the Metropolitan Asylums Board. A sketch was given of the origin of that Board, and of its development into a central authority for the hospitalisation of cases of infectious disease in London. The total provision made by the Metropolitan Asylums Board was not far short of one bed to every 1000 of the population, which was the standard of requirement for public health purposes. The excellent example set by the Board in this respect had already been followed by several large towns, and before long no town of importance would be without the means of isolating cases of infectious disease. On the other hand, the Metropolitan Asylums Board had taken a lesson from provincial sanitary authorities by throwing the isolation hospitals open to all patients, whether pauper or not, without payment. The position of the Board had, however, been greatly changed by the Local Government Act. The County Councils formed by that Act were intended to be the chief sanitary authorities of counties in the future. They already had control of the lunatic asylums, and it would simplify sanitary administration if the control of the isolation hospitals were also relegated to them. A special reason for the transference of this responsibility in London from the Metropolitan Asylums Board to the County Council existed in the fact that the latter body had a responsible medical adviser of its own, while the former had to depend on casual and irresponsible counsel. On the whole, the Metropolitan Asylums Board, having done the work which it was created to do, had no longer any sufficient *raison d'être*. In county sanitary administration it would be advantageous if the County Councils were immediately to undertake the functions of central sanitary authorities. As far as isolation hospitals were concerned the present system was an administrative chaos. Owing to division of authority, hospitals with every provision for the isolation and treatment of infectious diseases might stand empty while epidemics were rising almost at their very doors, but outside the administrative districts to which they belonged. With regard to the future of sanitary administration, further evolution should be in the direction of greater simplicity of organisation and a nearer approach to uniformity in the size of sanitary districts and in the methods of administration than was now the case. The question of "whole service" must be considered in connexion with that of the formation of administrative areas large enough to provide sufficient work and adequate remuneration for the medical officer of health. While deprecating cut-and-dry systems of administration and excessive centralisation, Dr. Seaton thought the present freedom of local authorities from all control was apt to degenerate into administrative licence, with serious results to the community at large.

PUBLIC MEDICINE.

Dr. WOODHEAD opened a discussion on the Communicability of Tuberculosis from Animals to Man. In considering the question, he said that it must be confessed at once that the direct evidence at our disposal is almost *nil*, and that until a more systematic attempt was made to arrange statistics and to observe the bearing of these on different periods and under different conditions we should make little advance in the collection of direct evidence. All the evidence we do possess was either inferential or was obtained as the result of the experimentation on animals. Former observations, however, have paved the way for others, and have certainly made evident the weaker links in the chain of evidence. Some time ago he attempted to follow the course and lines of infection of tuberculosis in a number of children, and it was exceedingly interesting to note (as previous observers had described) the relative frequency of intestinal and mesenteric tubercle (often the only form of tubercle present) that occurred in children. In 127 cases analysed, tubercle of the intestine was found in 43, 24 of these occurring between one and five years and a half. Tubercle of the mesenteric glands was found in 100 cases, or in nearly 79 per cent. of the whole; here, again, 62 occurring between one and five years and a half; and of 14 cases in which the mesenteric glands were affected (i.e., no trace of tubercle in any other part of the body could be found), 9 were referred to this period. It was noticeable that of these 100 cases only 20 were diagnosed as suffering from abdominal tubercle, from which it might be argued that tabes mesenterica is of much more common occurrence than is generally supposed. From all that could be learned from these cases (and reference was made to other statistics proving practically the same), it is evident that intestinal and mesenteric tuberculosis are most frequently met with in children during the period after they are weaned, at which they are taking cow's milk in place of mother's milk, the point of entrance appearing to be by the intestine, and if it could be at once accepted that this was the case all could be readily enough explained. It has been stated, however, that tubercle cannot make its way into the tissues without leaving some evidence of its invasion, but from a careful examination of a number of cases it is evident that in some at least the tubercle bacilli have passed from the intestine into the mesenteric glands without leaving trace of any lesion to indicate the point of entrance. It had to be remembered, however, that here the tissues are not in any way injured, as in most experimental cases, but have simply their vitality impaired, and cannot act as a defensive barrier. Experiments carried on by Chauveau, Bang, Nocard, Bollinger, Galtier, Johne, M'Fadyean, the author, and many others were quoted. All these observers were able to demonstrate the presence of active bacilli in the milk from tuberculous cattle; some investigators obtained them in the epithelium of the milk ducts, or actually lying free in the ducts after the death of the animal, and it was concluded that it might be accepted as proved that wherever the presence of tubercle in the udder could be determined clinically it would be little less than criminal to give the milk to delicate children, or even to children suffering from any catarrhal derangement of the intestine, conditions that were specially frequent amongst the poorer classes where the standard of health is exceedingly low, and the liability to catarrhal conditions very great. A number of other experiments had been conducted to determine whether the milk from cows, in which there is undoubtedly tuberculosis, but in which there is no clinical evidence of tubercle, was infective. Here the results are much more conflicting; but although in many cases they have been negative, every observer has been able to obtain positive results in a certain proportion of cases, and although the percentage of such cases is comparatively small, it is large enough to accentuate the feeling that most people who have studied the question have, that it is absolutely necessary that precautionary measures should be taken before using milk that comes from any unknown dairy. From his own inoculations with tubercular udder and with milk from tubercular udders, Dr. Woodhead had obtained about 70 per cent. positive results; with non-tubercular udders and with the milk from non-tubercular udders taken from otherwise tuberculous cows he had obtained about 16 per cent. of positive results. From the results obtained by all observers there could be little doubt that the milk yielded by tuberculous animals may be instrumental in communicating the disease from animals to man, and that the question called for legislation. The first thing to be done was to insist that a regular staff of veterinary inspectors well trained for this special work should be appointed whose duty it would be—(1) to examine fortnightly all cattle giving a milk-supply, and who should have the power to order isolation of all cattle in which the presence of tuberculosis was suspected; (2) that it should be penal for any dairy farmer to throw into his milk-supply the milk from any cattle which had been isolated by the veterinary inspector; (3) no phthisical patient should be allowed to have charge of any department in a dairy.

As regards meat, the question was much more difficult to treat, for after most careful experimentation it had been found

that in only a certain proportion of cattle affected with tuberculosis did there seem to be any great danger to be anticipated from the ingestion of their flesh; but it must be remembered even in this connexion that tuberculosis in cattle is much more common than was usually supposed, and that if the meat from only 1 per cent. of actually tuberculous animals could produce tuberculosis, the risk would be three or four times as great as the older statistics might lead us to expect; it was found that the more perfect the inspection of meat in any country the higher rose the tubercle statistics. In those countries in which inspection was compulsory only in certain districts the statistics in the inspected areas were usually from two to four times as high as in the statistics coming from the uninspected districts, and it is evident from what has been observed both in this country and abroad that tuberculous carcases are disposed of for consumption in the uninspected areas, and are thus never heard of. Bollinger's statistics show that in Augsberg the number of animals detected as tubercular in 1888-9 was 4·5 per cent.; whilst in 1889, when the system of inspection became more perfect, it was 8·8 per cent. Similar statistics from other towns give from 12 to 17 per cent; but veterinary authorities both in this country and in Germany are of opinion that it is frequently as high as from 30 to 40 per cent.; so that legislation was imperative if only 1 per cent. of these cattle were dangerous, and even the most favourable results recorded would not justify a more optimistic view than this. The first thing of course is to obtain data on which to work. The results of other observers have been collected and a number of experiments have been carried on from which it could be gathered that although in the earlier experiments far too high positive results were obtained by the inoculation of meat and meat juice from tuberculous animals, nevertheless a small proportion of positive results form a basis for future work. The first thing to institute in connexion with the stamping out of tuberculosis was thorough compulsory inspection, in order that data on which to carry on further work might be obtained; that all private slaughter-houses should be gradually abolished, and that no new licences should be issued, and no new tenancies accepted; that central slaughter-houses and meat markets under the strictest supervision should be erected in convenient centres, and that all meat should be marked as first or second class, and that if unmarked it should be saleable only under well-recognised conditions; that no animals in which tuberculosis was diagnosed, and in which it extended to more than one organ and to serous surfaces, should be exposed for sale; and that those animals in which tuberculosis was present in a single organ should only be sold to the consumer on the understanding that it was to be specially well cooked. Such temporary measures might be made more severe, or they might have to be relaxed, according as further experiments proved that they were too stringent or were not adequate for the purposes for which they were drawn up.—Dr. RUSSELL pointed out that in Glasgow they had early taken a firm stand against the sale of tuberculous meat. They had had a severe fight, but he was convinced that it had been to the advantage of the community that they had taken the steps they had. They were now considering the question of the inspection of dairies, and he thought it was a good sign that the dairy keepers themselves had helped them in their work rather than place obstacles in their way. He believed that it would be to their advantage were they to throw out from their dairy-supply all tuberculous cattle. In Glasgow, where amongst the poorer classes the standard of health was very low, this question bulked very largely in their work.—Dr. BROOK thought that it would be possible by the general condition of the cow to determine whether it was in a fit condition to give milk for consumption. He had made dairy farming a hobby, and was much interested in the question.—Dr. RIDGE spoke of the immunity as regards consumption that the Jews enjoyed, and thought that it might be that this was partly due to the fact that they were much more stringent in their regulations as to the purity of their food-supply. He wished to know whether anyone could tell him whether vegetarians were less liable to tuberculosis than were meat eaters. For his part he could not remember a single vegetarian who had died from consumption.—Dr. LOGAN referred to the insanitary conditions under which animals exist in our large towns, and said that he had it on the authority of a veterinary surgeon that in certain districts 40 per cent. of the animals were affected with tuberculosis.—Dr. FRANKLIN PARSONS thought that milk was so rarely given to the children of dispensary patients that it might be left out of count almost, as a factor in the production of tuberculosis amongst them. He also spoke of his own and Dr. Klein's observations on the sterilisation of milk by boiling, by which they had been able to prove that any milk might be rendered innocuous by exposing it to a temperature of 212° F. for a comparatively short time.—Brigade-Surgeon MCGUIRE referred to the fact that in Malta the milk used by the natives was obtained from goats, animals which were known to suffer very little from tuberculosis. He thought it would be interesting if statistics as to the amount of tuberculosis amongst these people could be obtained.

Dr. WOODHEAD, in his reply, referred to the very excellent work done by Dr. J. B. Russell in Glasgow, and he entirely agreed with the remarks made by that speaker. He pointed out that it was an exceedingly difficult matter in many cases to diagnose the very earliest conditions of tuberculosis of the udder, although once the disease was set up it advanced very rapidly. It was probable that it might follow injury or other inflammation of the udder, when the animal was already tuberculous, and the animal might be in comparatively good condition as regards fat and flesh, even where the udder was markedly tuberculous. The difficulties of diagnosis were very considerable, even when undertaken by experts, but now that a number of different signs and symptoms could be considered together, the question of diagnosis had certainly been much simplified. As regards the question of immunity of the Jews from tuberculosis, it must be borne in mind that almost the whole of continental legislation on the subject was based on the laws of the Jewish dispensation, and it was because of the strong Jewish element in foreign communities that their advanced position as regards rigid inspection of meat had been taken up.

EXHIBITS.

In continuation of our report on the exhibits in the museums of the Association at Bournemouth, necessarily curtailed on account of the distance apart of the various rooms, the following stalls came under our notice. Among the exhibits of medical and surgical instruments, the stall of Messrs. Arnold and Sons was noteworthy. Many new instruments and modifications of older ones were displayed, including a new hypodermic syringe by Dr. Bokenham, a new sulphur fume apparatus by Dr. Adams, a new ligature box by Mr. Bruce Clarke, and a new form of instrument for correcting deformities of the nose devised by Mr. Walsham. Messrs. Lynch and Co. exhibited a large assortment of instruments constructed of aluminium, and recommended by them for their extreme lightness and cheapness and on account of the inability of the usual applications to act on them. Messrs. Weiss also displayed a large collection of new and interesting instruments. Messrs. Pocock Brothers had an unusually instructive display, including a model of an improved padded room for asylums, a specially designed bed and bedstead for epileptics, and many other novelties of a similar nature. Mr. John McMillan of Glasgow exhibited a new form of protective gauze, to be applied over a wound with an ordinary surgical dressing. In the division allotted to Food and Drugs, Johannis, a naturally aerated table mineral water, bottled at the springs in Germany and exported to this country (upon which we fully reported last week), was shown, and specimens of it distributed. Messrs. Cainrick and Co. exhibited, in conjunction with the Maltine Manufacturing Company, certain preparations of beef peptonoids—concentrated beef and milk with gluten; they also showed a bitter water containing a large proportion of magnesium and sodium sulphates. Messrs. Mason and Co. had a large display of specialities for invalids. The "Bouillon" prepared by this firm claims to be made entirely from British beef. Messrs. Balz and Co had a good show of Loeflund's dietetic milk and malt products, of great interest to practitioners interested in dietetics and diseases of children. An interesting stall was that of Mr. B. Kühn, who showed the fruit and seed of carica papaya, specimens of the succus, several photographs of a tree with flowers and fruit, and various preparations of papain. Many other excellent and interesting exhibits were arranged in the museum rooms situated throughout the town, which, however, the exigencies of our space reluctantly compel us to omit from our brief notice.

THE LANCET.

LONDON: SATURDAY, AUGUST 15, 1891.

THE Seventh International Congress of Hygiene and Demography, which we welcomed to England and to our metropolis last week, has in many respects been an important event. In numbers it has far exceeded any of its predecessors, and if any of its members has failed to receive a due share of the hearty greetings which it was desired to manifest towards them, that result has been alone due to the fact that the foreign and home visitors have so largely exceeded the numbers anticipated. Her Majesty the QUEEN and the Prince of WALES have both taken a personal part in welcoming the Congress to London, and hospitality, both private and public, has been widely extended to its members. This is what we have desired as a nation, and we trust that the result attained will be regarded as on the whole eminently satisfactory.

But the principal importance of the Congress lies in the success of the gathering from a scientific point of view. The subjects dealt with have been almost bewildering in their multiplicity and in wideness of scope, and exhaustive discussion has on several occasions been quite impossible for lack of time. But the stimulus afforded to scientific workers will be great, and future inquirers cannot fail to find substantial help in the permanent record of the meetings which the Transactions will afford them in their studies and their methods of research. On some points great differences of opinion have been expressed, and this notably on the question of quarantine, as to which it must now be evident that the attitude which England has so successfully adopted is never likely to be changed in the direction which some of our foreign *confrères* suggest. Diphtheria is a subject that elicited much attention, for its growth in our towns is but a phase of a similar extension which causes anxiety in Europe generally, and across the Atlantic. Alcoholism in its relation to public health, and the prevention of tubercle, whether considered from its bacteriological point of view, or according to the topographical distribution, were also subjects which elicited much attention, and the exchange of views which has resulted can only be profitable in its results. The application of bacteriological methods to the study of preventable diseases came strongly to the fore, and the relation of diseases affecting the human subject, such as scarlet fever and diphtheria, to maladies in the lower animals was for the first time fully brought before an international gathering of experts in human and in veterinary medicine. Indeed, the joint action of those two branches of medicine augurs well for future united research in subjects affecting man and the lower animals, as to which much more light is needed than we at present possess.

The hygiene of infancy and childhood, and the influence of school life, were also subjects of deep interest. They were discussed from numerous points of view; but, happily, all were agreed that if we desire to secure health and prosperity in adult age, we must begin our labours during the early years of life. And if we would have wholesomeness in our homes, the future fathers, and above all the future mothers, of our populations must be so trained that they will themselves appreciate the value of applying the elementary principles of public health in their daily dealings in the family. We have now for many years found that a scientific basis must underlie all true public health work, and few branches of science are of more value in the prevention of disease than those which the chemist and the physiologist make their study. These branches were well represented, and the subjects discussed had a practical bearing on the prevention of those evils which it is the object of the Congress to avoid. In much the same way architecture and engineering found a prominent place in the week's proceedings. Our dwellings, our hospitals, and our great constructive works of sanitation depend for their success on the application of public health principles to the works executed, and we trust that the record given of our progress in these matters in this country will be helpful to other nations and afford a stimulus to many authorities at home whose zeal needs some pressure from without.

The interests of armies, navies, and of the mercantile marine were rightly regarded as sufficiently wide to occupy the time of a separate Section, and this department of hygiene attracted a number of able officials from all parts of the world. The improvements effected in the health of armies have of late years been great. We have much to record in this respect both as regards our men at home and in India, and some valuable experience has been submitted to the Congress by other nations. Much the same applies to our fellow-subjects afloat, and in respect of food, clothing, lodging, &c., we have learnt how much disease that was aforetime regarded as a necessary incident of naval and military operations is in reality altogether preventable. All these matters concern the peoples of the nations, but the very title of the Congress necessitated a separate Section, in which the welfare of the people should be especially discussed, and the demographers met to teach, by statistical methods, a series of valuable lessons concerning the influence of trades and industries on health, and to point out a number of other considerations affecting the physique of man in a variety of manners.

And lastly, there was a State Hygiene Section; for to both States and peoples must be trusted the application of all these varied public health methods. In this country we have endeavoured to secure for our sanitary legislation a scientific basis; although, alas! one or two of our statesmen who have succeeded in making some reputation in such legislation have not hesitated to imply that the scientific aspect of the very work which secured them credit might, after all, be left to take care of itself. Foreign nations judge us otherwise, and they have during the past week been but too plenteous in their praise of our Public Health department, where practice and science proceed side by side in an effort to secure the welfare of the nation and the prevention of disease. We trust these two methods will never be separated; indeed, if we are to maintain the position so courteously accorded to us up to the present time, it must be by such extended research as will secure a scientific foundation for

all our administrative measures, be they imperial or local If progress in this direction is fostered among the civilised nations of the world, as the result of the present gathering of experts, the Seventh International Congress of Hygiene and Demography will have met to good purpose, and the Royal approval and support it has received will not have been bestowed in vain.

IT is in a sense fortunate that the water famine which has so largely prevailed, and still prevails, in many parts of Scotland has found the rural districts under the sway of the District Committees of the County Councils rather than of the Parochial Boards as of old. Had the parish still been the sanitary area, little permanent benefit would in all likelihood have resulted from the present outcry, proceeding from many quarters, for an improved water-supply. For with the passing away of the pressing need, the popular interest in the matter would have subsided, and the local authorities, having been, after all, only "hauf waukened by the din," would have thankfully sunk back into their accustomed slumber. But there is now in charge of the public health a better class of men, less pervaded by the narrowness of the parochial spirit, and furnished, moreover, with a wider and more workable field of action; and here and there throughout the country evidences abound, in the shape of proposals for the creation of special water-supply districts, and for the formation of new police burghs, that the lesson which the summer drought can teach is falling on not unwilling ears.

So far the most notable outcome of the awakening is the passing through both Houses of Parliament of the Public Health (Scotland) Acts Amendment Bill. Its main provisions are very simple. The Act is to take effect in a district only when the County Council, in response to a request from a District Committee, shall have passed a resolution for its adoption. Then (and this is the essence of the measure), where water is provided by the local authority, two water assessments will become leviable—(1) a public water rate not exceeding threepence in the pound, "upon all lands and heritages within the district, or special supply district, as the case may be," and (2) a domestic water rate "upon all lands and heritages within the district or special water-supply district, as the case may be, which shall have been supplied with water by the District Committee," this latter rate being sufficient to defray the balance of the expense entailed in providing the supply. We have given these two provisions in their natural order, though, curiously enough, they are reversed in the Bill itself, possibly with some notion, which also seems to lurk between the lines of the Memorandum accompanying the Bill, of concealing the radical nature of the principle involved. It imposes on all who own or occupy lands or heritages within a district a considerable part of the cost of supplying one of the prime necessaries of life to people in any part of the district, they not being paupers in any ordinary sense of the word. Even without the Act, according to the Board of Supervision, a local authority might agree to bear any taxation, in excess of a district-rate of 2*s.* 6*d.* in the pound, incurred in providing water-supply and drainage in any special district within its bounds. But where the new law is adopted the general assessment is to become primary, and not merely supplementary as heretofore.

Of the need for such legislation those who know the condition of things in rural Scotland can have no manner of doubt. As has just been incidentally mentioned, not more than 2*s.* 6*d.* in the pound, payable in equal portions by proprietor and occupier, can be levied on any special district for combined water-supply and drainage purposes. This, in fact, is the limit of taxation for all purposes under the Scotch Public Health Acts. In many small villages, with a poor population and an inferior class of houses, the limitation is prohibitory; and, indeed, in some localities, where, say, a drainage scheme has been gone into, the total assessment runs the risk of being entirely used up for the one purpose, leaving nothing at all for the other. Small landlords and poor tenants will alike be benefited by the change. The former in the meantime have to pay their moiety of the tax, up to the limit of 1*s.* 3*d.* per pound, even if they have no need for the water-supply which it provides. Under the Act, their share cannot exceed 1½*d.* per pound. And the wider area of assessment will yield so much that the tenant's tax will also be greatly diminished.

Very likely large owners or occupiers of land twenty or thirty miles distant from the locality to which the water is supplied may grumble at the new burden. But, as has often been pointed out in reference to similar questions, if such a one can take a broad enough view of the matter he will see that even his interests may be conserved by the change. It may be cheaper for him to pay the water rate than to maintain in hospital the enteric fever cases that might arise from the want of the water, in addition to his having to maintain also the paupers left behind by the bread-winners cut off by the fever. And if zymotic poison, bred of dirt in a waterless district, should spread to his own doors, he might learn the truth of a recent saying of Dr. RUSSELL, that such diseases prove to a man, in very terrible fashion, who is his mother and who are his brethren.

In the House of Lords a fear was expressed that the consent of a County Council might sometimes be obtained by a special muster of supporters at an otherwise small meeting. To prevent this the Secretary for Scotland, at the last moment, inserted a clause by which it becomes necessary to obtain an absolute majority of the members, both of a district committee and of the County Council. In this way the protection of outside interests is surely abundantly strengthened. And if their power of veto be too freely exercised by Councils the question will be certain to arise whether each district should not be allowed to adopt the Act for itself without any reference to the County Council as a whole. Meanwhile the Lanarkshire gentlemen who have had so much to do with the Bill are to be congratulated on the passing of a measure which will be useful not only to their own locality, but to every county whose Council has the good sense to take advantage of it.

THE bracing and tonic influence of mountain air is now one of the most familiar facts of medical climatology. How far this influence is due to the atmospheric rarefaction, to the dryness of the mountain climate, to its cold, to the

exceptional amount of sunshine which many of the elevated resorts enjoy, or to the habits of activity which these climatic peculiarities combine to induce, must remain a question very difficult of complete solution. Probably several factors unite in the production of the well-marked tonic effect with which we are so familiar. It would be extremely interesting to eliminate all other factors and inquire what is the effect of altitude *per se* on the human organism, but the inquiry is beset with very great difficulties. One of the most recent and most plausible suggestions made on this subject is that, owing to the low pressure of the atmosphere at high altitudes, the absorption of oxygen by the pulmonary alveoli is facilitated. This seems probable *a priori*, and some interesting and valuable experiments have been reported in support of this doctrine. In former years the frequency of what was called "mountain anæmia" among the dwellers at high altitudes was much dwelt upon as of unfavourable augury for the prospects of patients sent to the elevated resorts; but it is now sufficiently plain that this anæmia is simply the natural result of the scanty food and constant hardships which are in many places the lot of mountaineers. So far as we are aware, experience at Davos and elsewhere does not lend any support to the idea that with ample food and adequate comfort anæmia is abnormally frequent amongst those who resort to the mountain sanatoria. Recent experience in the treatment of phthisis tends to show that elevation is not *per se* the most important factor for phthisical patients, but rather he purity of the air, the abundance of sunlight, and the active habits which are prominent features in the life at high altitudes. Thus, as most of our readers are aware, the results of practice at such resorts as Falkenstein and Görbersdorf, with an elevation of from 1000 to 2000 feet, are hardly, if at all, inferior to those obtained at Davos and St. Moritz, with an elevation of from 5000 to 6000 feet. Elevation is, no doubt, in many cases most important, but rather indirectly than directly. In the present state of our knowledge, it does not seem possible to lay down any precise rules as to the degree of atmospheric rarefaction to be desired in the various cases of disease which are known as an empirical fact to benefit decidedly by a resort to the mountains.

While our readers are probably quite familiar with the therapeutic advantages of mountain air in cases of overwork, nervous exhaustion, dyspepsia, hypochondria, and phthisis (to mention a few of the cases where the benefit of a recourse to high altitudes is usually most striking), they may at times be somewhat puzzled by the conflicting statements made regarding the contrast between the winter and the summer climate at the mountain stations. It may seem odd to many that at a season, say August, when so many are hastening to Mürren, and Zermatt, and Maloja, it should be *de rigueur* for the phthisical patient to shun Davos and Wiesen, which afford him such suitable quarters in winter. Yet there is some reason in a practice that seems at first sight anomalous. The Alpine climate is always bracing, except at those exceptional times when the relaxing Föhn wind prevails, but its characteristics vary considerably both with season and locality. It is sometimes, and in some places, windy and cloudy, at other times and in other places profoundly still and flooded with sunlight for successive weeks. As a rule winter is the season in the favoured localities for long spells of calm and sunshine. In summer, while the weather is often magnificent, wind and rain are not uncommon. Shelter is, again, a very vital point, for without adequate shelter the winter climate of the Alps would be simply intolerable to very large classes of invalids. The somewhat sombre and unattractive valley of Davos owes much of its utility and fame to the girdle of mountains which shuts it in and renders its atmosphere often so exceptionally calm.

While, then, winter has been, on the whole, wisely selected as the special time for the "mountain cure" for cases of phthisis, and summer and autumn as the time for sending nervous and dyspeptic invalids to the Alps, this rule is only a general guide, and is most misleading if interpreted too rigidly. There is no good reason why the sufferer from phthisis should leave the mountains at the approach of spring, if *ennui* and home sickness are not so strong as to counterweigh all other considerations. There is, on the other hand, no reason whatever why the nervous or dyspeptic invalid should not try the mountains in winter. Almost the only serious drawback to that season is the shortness of the days and the consequently greater demand upon the patient's resources for keeping himself occupied and amused.

There are certain broad rules which may be laid down with tolerable confidence regarding the cases which are unsuitable for the mountains at any season. The very aged should rarely, if ever, be sent to high altitudes, inasmuch as they are apt to be unduly depressed by cold, and are for the most part unable to practise those habits of activity without which the mountain climate is usually either useless or positively hurtful. Those with weak hearts or atheromatous bloodvessels constitute another unsuitable class. Rheumatic and renal cases are obviously not adapted for a cold and bracing climate. Cases of profound nervous exhaustion, acute insomnia, and utterly damaged digestion, are generally unsuitable for the mountains; but these cases call for great discrimination, and not infrequently a great success will be obtained in what seemed far from a hopeful case. If there is no organic disease of the nervous centres, it will be well to give many cases of very bad nervous breakdown the chance of mountain air, the benefit, even in grave cases, being often very great. In the same way, also, if there seems any chance of the digestive powers responding to the stimulus of the mountain climate, we should not too readily assume that these cases have passed beyond the stage when the high altitudes may be appropriately tried.

NOBODY has more need of a holiday than a medical man, and there have been few years in the memory of living practitioners in which work has been so exacting and so exhausting as in the present year. During the influenza weeks the list of patients suddenly grew to double or treble its length. Not a few practitioners were themselves overtaken with the epidemic. Some pluckily struggled on with practice for days, with a febrile temperature and all the acute malaise of the disease; others were prostrated for weeks, and had to steal a few days more to recuperate at the seaside. Only less exhausted are those practitioners who never actually succumbed, but have gone on steadily

through the long months of work. There is now a lull, and it is the duty of every medical man to contrive a distinct escape from labour.

"The sweet vicissitudes of rest and toil
Make labour easy and renew the soil."

Of all the things that facilitate a medical man's holiday and double its value as a rest, probably the most important, is the behaviour of those whom he leaves to do his work. Faithfulness in the *locum tenens*, and kindness or neighbourliness in the professional brother who is almost sure to be called in to one or more of his patients, will not only be the pleasantest subject of reflection for the faithful *locum tenens* and the kind neighbour, but will give a new sensation of satisfaction to the practitioner in whose behalf such virtues are exercised. Our readers will notice that every holiday season brings us a crop of ethical questions arising between brethren, and sometimes brings them into the law courts, which should never arise, or which, when they do arise, should admit of the easiest settlement. The law of kindness binding medical men to consider each other's interests and feelings is a very strong one in ordinary times. But special questions arise in holiday seasons. The dissatisfaction of patients with the strange practitioner, be he *locum tenens* or friend of the regular adviser, leads to frequent friction or even dislocation of old connexions. Occasionally such things are unavoidable, and a sensible practitioner accepts the fact with dignity, and as a part of the price of a holiday. But with a little holiday allowance, and a disposition to serve one's neighbour and smooth his period of vacation, it is astonishing what we can all do for each other. There is no holiday ethic greater than this, that when one's professional brother is away we are to remember all his virtues and be oblivious of his faults—to treat his patients as carefully as our own, and hand them over intact to him on his return. The peevishness of patients is more natural and excusable when temporarily left by their own adviser, but this is a poor reason for taking it too seriously, or readily consenting to take them as our own. The profits of some practices are so modest that a *locum tenens* cannot be supported, and many men go through long lives without the luxury of a holiday. We once met a country practitioner whose only idea of a holiday in forty years was "once when he had typhoid fever." A little more kindliness and trust between rival neighbours would often make a holiday quite practicable where at present it is not thought of. But in every place and under all circumstances in the months of August and September there is need for a special benevolence that subordinates rivalry to neighbourliness, that will take no mean advantage of a brother's absence, but will find special pleasure in stopping a gap for him. We do not mean to encourage any man to slovenliness or thoughtlessness in throwing work during his absence on willing friends. Midwifery and all calculable work should be arranged on reasonable principles. But for exceptional incidents of practice and whims of patients, for the sake of smoothing a brother's holiday, we advocate the largest construction of the duties of professional neighbourliness. The services of a substitute are on a somewhat different footing towards the practitioner whom he represents. He is more bound by clear terms of contract. But even so, he has much to answer for in respect of the spirit in which he does his work and the faithfulness which he brings to that "which is least." His position is often a trying one, and calling for the sympathy of all the friends of his principal. But there is only the more credit to him for the honest discharge of duty and the rigid exercise of a good temper.

Annotations.

"Ne quid nimis."

THE CONGRESS OF HYGIENE: VISIT TO OSBORNE.

ON Thursday last, by command of the Queen, Sir Douglas Galton, Professor Corfield, Dr. Poore, Mr. S. Digby, and twenty-five distinguished representative members of the Congress, proceeded to Osborne to be presented to Her Majesty and afterwards to take luncheon. The omission of Mr. Malcolm Morris, the Hon. Secretary of the Reception Committee, from participation in this honour cannot fail to excite surprise. It may, however, be inferred that the presence of Mr. Morris was deemed absolutely necessary at Burlington House for the carrying on the work of the Congress.

SANITARY ADMINISTRATION AT MIDSOMER NORTON.

THE Local Board of Midsomer Norton have changed their medical officer of health, and they have done so under just those circumstances which are calculated, if persevered in, to lead the Legislature to give to the Central Authority additional powers as to changes made by local bodies in their sanitary officers. Mr. Waugh presented his annual report for 1890 to the Local Board, and they formally, through their clerk, expressed "their surprise and dissatisfaction" at its general tone. We have the clerk's letter before us, and he explains that this surprise and dissatisfaction culminated in four points. One relates to the non-adoption of compulsory notification; and yet this very local board vacillate in a curious way in this matter, for they once adopted it unanimously and then rejected it, whilst the neighbouring authorities have adopted it without any friction whatever. The next relates to an isolation hospital. Twelve times has Mr. Waugh urged such provision, but, according to the clerk, this district is such an extraordinary one that "no suitable place" is regarded by the authority as "available." This story has been so often heard before, only to be followed by the hurried erection of a useless building in a small-pox panic, that it carries but little weight, in face of the obvious fact that if one could not be erected Mr. Waugh is not likely to have so persistently recommended it. Dr. Blaxall of the Local Government Board also believes that even Midsomer Norton can find a site, for he too has urged the same matter. Then the Local Board object to advice as to the ventilation of their sewers. This matter was urged on them by Mr. Waugh in 1878 and by Dr. Blaxall in 1888, and the clerk now says the necessary pipes are in stock. But Mr. Waugh and the local inspector cannot find the stock in question, and this in a district where in 1888 only seven ventilators were provided for the system of sewers. Another point relating to privies connected with sewers may have led to some misapprehension. But on this report, in which Mr. Waugh has only fulfilled his most obvious duty, he has lost his appointment and a successor has been chosen. We can only sympathise with the inhabitants of a district who have as their representative an authority the majority of which acts as the

Midsomer Norton board have done, and we hope the minority who resisted such action will see that their new officer is not similarly hampered in performing his duties.

THE MARKINGS ON THE FINGER TIPS.

DR. D'ABUNDO has published the results of some researches on the markings on the tips of the fingers. He examined the fingers of seven idiots, and found that the markings on the tips of all the fingers on each hand were identical, thus showing a marked difference between those of idiots and of sane people. The thumb tips of one idiot had the same markings as those on his fingers. There was a noticeable smoothness of the finger tips in all the idiots. In one case Dr. D'Abundo remarked a perfect resemblance between the markings on the fingers of an idiot and on those of his mother. Out of twenty cases of imbecility Dr. D'Abundo found in four only one sort of tracing on all the fingers; in the rest there was a tendency to repetition on almost all the fingers. In hemiplegia, when the lesion was of old standing, he noticed in the part affected a distinct smoothness of the finger tips, which prevented him from obtaining a clear-cut impression. From a medico-legal point of view, these researches may ultimately have an important bearing on crimes of a sanguinary nature. For instance, if drawings were taken of the impression of a hand bathed in blood the markings would be most clear, more especially if the criminal had not merely laid his hand on any papers, but had actually fingered them. The evidence of crime would be still more valuable if the criminal had some cicatrix or deformity on the fingers.

THE REPORTED DEATH UNDER ETHER.

THE following particulars concerning the death of a patient, which occurred at University College Hospital on Aug. 3rd, are instructive, as emphasising the difference between a death under an anæsthetic and a death from an anæsthetic. The patient in question, aged forty-three, was admitted into hospital in a very bad state of health, suffering from a large gangrenous fibroid of the uterus. On Thursday, July 29th, she was put under the influence of ether, and was under it for half an hour. Again, upon the Saturday following, it became necessary to etherise her, and upon this occasion she was under the anæsthetic for two hours, but appeared to bear the operation well. On Monday, Aug. 3rd, her condition was unsatisfactory, the temperature being 102°, the pulse 140, and her general state precarious, due partly to the great loss of blood she had sustained before entering the hospital, and partly to the poisoning of her blood by the sloughing fibroid. It was feared that owing to the smallness of the outlet the liberation of the fibroid mass, which had been cut off by means of an écraseur before the anæsthetic was administered, would occasion too much shock, and so it was deemed advisable to again give ether, which was successfully done. The patient took the anæsthetic very well, without struggling, and in view of her condition care was taken that only so much was given as would ensure true anæsthesia without incurring the slightest risk of overdosage. After the patient had been under the ether for ten or fifteen minutes, the fibroid mass having been easily delivered by traction with the fingers, and the uterus being irrigated, ether was discontinued, and the respiration was noticed to be diminishing in force—in fact, failing. Neither at this nor at any time did respiratory embarrassment appear; the breathing simply grew less and less vigorous. At this time the pulse, although rapid, remained fairly good. Artificial respiration was at once used to supplement the failing breathing; but, in spite of this, the pulse began to fail, and in seven minutes ceased. The house physician, an expert anæsthetist, described the death as being simply that of a person whose vitality was exhausted. There was no marked cyanosis and no bronchial or laryngeal trouble; indeed, none of the symptoms of poisoning from ether were present. The necropsy was performed four days after death, so that none but gross lesions could be recognised, and with the exception of old-standing adhesions of both pleuræ, none of these were present. The quantity of ether used was a drachm or two, certainly less than half an ounce. There was nothing in the operation which could cause shock, and the patient was completely anæsthetised throughout.

SWISS MEDICAL OPINION ON THE VIRTUES OF VACCINATION.

FROM Bienne a "Holiday Contributor" writes: "Macolin, with its fine Kurhaus, commanding from the slopes of the Jura a noble lake view, with the Alps in the distance, from Senlis to Mont Blanc, was on Saturday, the 25th ult., the scene of the ordinary summer meeting of the Medico-Chirurgical Society of Berne. Among the papers discussed was one on the vaccination question—in Switzerland, as in England, the subject of some professional, and, in far greater degree, of political agitation. So 'burning' has the question become in the Confederation that the Society was requested by the cantonal authorities to give it a place in its agenda, and after due deliberation and discussion to report its opinion. After a most interesting and effective debate, the Society, numbering many distinguished practitioners and consultants present, gave it as its conclusion that in vaccination we have the best and safest prophylactic yet known against the disease of small-pox, and that, in the view of the meeting, the principle of compulsory vaccination should, from the sanitary standpoint, have a place in the new law for the regulation of public health. On the other hand, with respect to State compulsion of vaccination, due precaution must be taken, in the public interest, that the practice be carried out under every possible guarantee of sound vaccine matter and of professional skill. To the report transmitted in the above sense to the cantonal authorities there were but few 'non-contents,' and these not certainly representative of the experience and standing of the medical school of Berne."

ATTEMPTED JUSTIFICATION OF SUICIDE.

HOWEVER we may try to account for the fact, it must be allowed that an increase in the frequency of suicide, proofs of which are not wanting, is a matter of most serious moment. As indicating grave disease of the social body, it may well exercise the diagnostic and curative skill of the physician in ethics. It is necessarily also a question which falls, to a large extent, within the proper sphere of the practitioner of medicine, and we need not, therefore, make excuse for discussing briefly its causes, its characters, and its remedies. Under the first of these headings many very different circumstances come to be considered. The recklessness engendered by excess, want, overstrain, disappointment, whatever, in a word, overclouds the present and loosens our mental grasp of a further good beyond the evil of to-day, takes part in its causation. How common the question, Is life worth living? How easy to many—to most at some time or other,—the impatient negative. Especially in these days when more than ever before overstrain and worry fill in the round of every active life does hope seem to struggle at times for its very existence. We need hardly wonder, therefore, if some perish out of mere despair in the strife of circumstances. We can even in a sense understand, though without approving, the argument of an American teacher who has tried to justify suicide in cases where disgrace or physical suffering appears to make life un-

endurable. An invalid, according to this authority, might, on the recommendation of three lawyers and three physicians, be allowed to procure for himself the repose of death. The narrow selfishness of the proposal—and this is what gives to suicide its proper character—is at once apparent. It is part of a system of casuistry, founded on purely personal views of human relationship. It is the utterance of one who, when he suffers the loss of ease, or honour, or success, thinks that all hope is dead for him, and he should die with it. There is no regard for duties which may still remain for him to do, for the embarrassment or the loss inflicted on others, or, if it be no more, for the missed example of patient endurance. Expediency wills the decease, and it may therefore be lawfully contrived! In all this nothing is more evident than the want of moral fibre. There is a total absence of any sense of liability beyond the sphere of personal interest. "There is no God," and instead we find an overmastering self without fixed faith in any external good, and with a will which is the mere sport of circumstance. The treatment of so morbid a mental condition will fail unless it recognise these as its essential characteristics, and we look for its cure not merely in the removal of present anxieties, not in reduction of labour strain, in ampler means, in restoration to physical health even, valuable as these aids undoubtedly are, but in a more courageous admission of man's dutiful relation to man, and to Him who "holdeth our soul in life."

THE SOCIETY FOR THE PREVENTION OF CRUELTY TO CHILDREN.

THE latest return issued by the National Society for the Prevention of Cruelty to Children contains a summary of work accomplished during the quarter ending June 30th. The total number of cases investigated within the area of the Society's operations during this period has been 1873 Prosecutions have been instituted in 248, and convictions obtained in 225 cases. Of the total number, 1111 come under the heading of neglect and starvation, 317 of general ill-treatment, 101 of abandonment and exposure, while begging, assault, dangerous performances, and immorality account for most of the remainder. The Society, we are pleased to note, moreover, has not been satisfied with merely protecting the persons of individual children. It has also taken a lively interest in the promotion of schemes which aim at more collective usefulness. Among these are the regulation of the employment of Italian children—a class only too well known as the subjects of cruel delinquency—and the stricter supervision of child insurance. Notwithstanding that the Bill connected with this latter subject has in the meantime been postponed, there is good ground for hoping that it will be passed in the course of the next Parliamentary session. We may then look for a measure which, without infringing the just commercial interests of benefit societies, will save them from acting as mere feeders of parental cupidity. Probably the best arrangement would be to make the insurance companies chargeable, not by parents, but by the undertakers they engage for funeral expenses. The prevalence of a species of gambling among children, by means of what are called "lucky turnovers"—i.e., confectionery containing coin—has not escaped the Society's notice. This foolish and injurious practice is already an active cause of childish extravagance. Its repression is a matter which may profitably engage the attention of local Councils.

THE TREATMENT OF STAMMERING.

NOTWITHSTANDING that the habit of stammering is of well-worn antiquity, it has not until quite recently taken its place among the recognised objects of systematic and remedial education. According to returns founded upon German statistics collected during the last sixteen years, the average number of stammering school children in Berlin and elsewhere amounts to about 1¼ per cent. of the total number in attendance. It is not remarkable, therefore, that the subject has attracted a good deal of attention abroad, and we may safely assert that it possesses among ourselves no less a title to consideration. The causes of this defect, and the appropriate methods of dealing with it, are well discussed by Mr. E. J. Seltman in the last number of *Physique*. As Mr. Seltman observes, it is needless to seek for etiological conditions in the organs of speech themselves, or even in the nerves associated with them. The stammerer, if his mind is at ease, does not stammer. It is in the presence of circumstances varying in different cases which to him suggest some imaginary difficulty that his impediment becomes apparent. Founded upon some original shyness, it may be, in addressing a teacher there is a not unnatural delay in utterance. Concurrently with this comes a feeling that he *must* speak. Intelligence and will together urge him to do so; the purpose is met by his conscious unreadiness, and the consequence is the marred result with which he himself and his companions are painfully familiar. His impediment therefore is imaginary. The remedies appropriate to his condition, if somewhat slow in operation, are not far to seek. They consist essentially in a change, a disentanglement of his perverted mental energies. All mental shock is to be strictly excluded. The habit cannot be cured by order. The pupil must be approached with tact, and habitually addressed in a quiet, slow, and deliberative manner. His imitative instinct will copy the method, and fluency will usually succeed the faculty of correct utterance thus engendered. When we reflect upon the frequently high intelligence of stammering children, the drawback imposed upon their education by this unfortunate habit, and its equally hurtful influence upon their usefulness as adults, we cannot too strongly impress the necessity of its early and methodical treatment. A course of three months will often suffice to attain the desired results.

INJURIOUS EFFECTS OF THE MANUFACTURE OF MELINITE.

DURING the last year or so several cases have been admitted to the Marseilles hospitals of poisoning during the manufacture of the new explosive, melinite, one of which recently formed the subject of a paper read to the local medical society by MM. Regnault and Sarles. The patient was a young man whose earliest symptoms were a prickling sensation in the eyes and loss of appetite; afterwards there were fits of coughing, but no hæmoptysis, which, however, frequently occurs in these cases. The man was admitted into hospital complaining chiefly of the cough and of fits of choking. His work had been to pour carbolic acid into nitric acid in order to manufacture picric acid, and he had consequently been constantly breathing nitrous acid fumes and probably also picric acid volatilised by heat. The fits of dyspnœa lasted about ten minutes and were accompanied by spasm of the glottis, the lips becoming quite purple, the number of respirations amounting to 56 a minute. During the attack the pulse was small and difficult to count, but was not above 65. Sibilant and sonorous rhonchi were heard, especially over the bases, at all times, but they were more marked during the attacks, which came on at intervals of from thirty to forty-five minutes. Shortly after admission, while the influenza epidemic was at its height, broncho-pneumonia came on, and the man died, this being the only case of poisoning by melinite manufacture which proved fatal, all the others recovering with rest. At the post-mortem examination, besides the lesions due to the

broncho-pneumonia, evidences of parenchymatous nephritis were found which appeared to have been due to the poison. Picric acid was detected in the liver, as it had been, indeed, in the urine during life.

THE HEALTH OF THE POPE.

AN Italian correspondent writes:—"As, in the popular belief, no cardinal can die without his being followed immediately to the grave by two others, so, in the journalistic world, the autumnal holidays can never set in without sensational rumours as to the health of the Pope. The present season has already had its quota of such *canards*—a little 'stronger on the wing,' perhaps, than in former ones. The truth as to the condition of his Holiness is simply this: Leo XIII. is an octogenarian, who leads a busy life, sometimes, indeed, so very busy that his strength is hardly equal to the strain imposed on it. On these occasions there is generally a recrudescence of two chronic ailments—to wit, intestinal catarrh, with sympathetic response of the renal organs. Moreover, with advancing years, he has betrayed something like the initial stages of senile anæmia. These symptoms concurring after an unusual press of business are apt to terminate in considerable prostration of the bodily powers, the mind remaining clear and active; and this prostration is, in turn, followed by extreme, sometimes alarming, somnolence. From this, however, his Holiness always emerges with renewed strength, and a general abatement of the complications, to resume his learned labours and meet the demands, administrative or diplomatic, of his post. His health is carefully and skilfully watched by physicians devoted to his service. They have lately prescribed for him a course of sand baths, heated to a temperature of 30° C. Perhaps it is this little detail that has given rise to the rumours above referred to."

THE LUGGAGE PORTER ABROAD.

IN those Alpine regions which divide Italy from Switzerland and both of them from Austria, few travellers can have failed to see or hear of the published remonstrances of hotel keepers against the exceeding weight and bulk of the impedimenta with which many of their customers arrive at the terminus. The railway porters who have to convey these from the luggage-van to the custom-house, and thence to the hotel omnibus, are sometimes hardly equal, strong men as they generally are, to the effort of lifting, carrying, and safely depositing such tremendous loads—a task, moreover, which has to be renewed by the hotel porters when, after an often tedious and laborious ascent of a mountain highway, the luggage has again to be lifted, carried, and safely deposited where its owner (sometimes relegated to a third floor), expects to find it. Strain of every kind, with permanent lesions in the form of hernia and aneurysm, is the not infrequent consequence to the poor men subjected to such an ordeal. Rather, say the hotel keepers, multiply the number of packages or portmanteaus than concentrate all your travelling effects into a mighty trunk, with its heavy clamps and boss-bestudded exterior till it becomes far too heavy and too bulky for an ordinary man's strength to deal with. There is, doubtless, good ground for this appeal, addressed as it is less often to our compatriots than to our American cousins, who, probably from their long absences from home and the extent of sea and land they have to traverse, are prone to carry about with them luggage enough for twice their needs or thrice their number. On the other hand, railway companies abroad must meet concession by concession. If travellers at their instance reduce the individual bulk while increasing the number of their impedimenta, the porters to whom these more manageable burdens are consigned must show some respect for their value as private property, and not dash them on the ground, or pile the heavier on the lighter and frailer ones, as they are too apt to do. The *personnel* of the Swiss railways are the greatest offenders in this respect. Travellers, generally ladies, have often to complain of the needless roughness—or rather, wanton violence—with which their valises or bags (containing medicine bottles or similar fragile and sometimes precious *matériel*) are flung about, and when taxed with their fondness for the heavy, iron-protected boxes complained of, naturally reply that they are driven to these by the destruction their property would otherwise undergo at the hands of rough porters. Like most controversies, this one between the conveying services and the travelling public must be settled by reciprocal concession, by the admission that each has legitimate ground of complaint, and by the effort on the part of both to do as either would be done by.

LANDRY'S PARALYSIS.

IN a paper which was read recently before the New York Neurological Society, Dr. Hun takes a comprehensive survey of the various explanations offered to account for the phenomena of acute ascending paralysis, and, from a careful study of recorded cases and of one of his own, he concludes that the condition is probably dependent upon some chemical change which affects either the motor cells of the spinal cord and medulla or the fibres springing from them—a change so profound as to cause entire arrest of the functions of those structures without leaving any trace of its action in the form of an alteration in cell or fibre which can be detected by our present methods of examining them. The case which he records is that of a man of forty-five who had had difficulty in lifting his feet and a feeling of heaviness in them for some time, but in whom the symptoms had become much aggravated in the week before he came under observation. He rapidly passed into a condition of complete paraplegia with great weakness in the arms and left-sided facial paralysis. He was unable to swallow and the bladder and rectum became inactive. His articulation also became thick and indistinct, and he rapidly sank into a comatose condition, dying within a week of his admission into hospital. There was at no time any impairment of sensibility, and, although all reflexes, both superficial and deep, were abolished, there was no diminution in the faradaic excitability of all the muscles. With the exception of slight cerebral and spinal meningitis and infiltration of the walls of some veins of the spinal pia mater, with degeneration of some fibres of the anterior roots of the cauda equina, the nervous system was found on most careful examination to present no abnormal appearances, and the author concludes, as stated above, that the symptoms are the result of some toxic influence exerted on the motor nerve cells or fibres.

THE POLICE AND DRUNKENNESS.

IT may easily be admitted that the police are often placed in a difficult position by the symptoms of injury or disease which simulate those of intoxication; and as it is manifestly impossible to summon a medical practitioner in every case of drunkenness they must of necessity act upon their own view of the facts, and, like all other persons who are required to form and act on judgment, they are entitled to a percentage of mistakes. But these mistakes, when they do occur, are always peculiarly regrettable; and in two cases which have just been reported it is hard to exonerate the police from blame. In the one case a constable having been called to assist a lady who was riding a restive horse, made up his mind that the rider was intoxicated, and she was subsequently summoned before the police magistrate for being drunk in a public place while in charge of a horse. The evidence adduced in support of the charge seems to have been ridiculously in-

adequate, and to have amounted to no more than the expressed opinion of the constable, supported by that of the gatekeeper at Stanhope-gate. Inasmuch as the lady had been taken straight to St. George's Hospital and there attended to by the house surgeon, there could have been no difficulty about obtaining medical evidence if it would have supported the case made by the police. The magistrate, as in the circumstances he was bound to do, dismissed the summons; but it is assuredly matter of serious complaint that even an executive department should put any person to the annoyance of police-court proceedings, though abortive, upon such utterly frivolous evidence as was adduced before Mr. Hannay. The other case was, in its results, more serious still, though in this instance the mistake appears to be much more excusable. A man was seen to stagger and fall in Islington, and when picked up was found to be in an almost helpless condition and conveyed to the police-station. He was placed in a cell, and detained there until three o'clock the next morning, when he was removed by his friends. Later in the day he became unconscious and died, the cause of death being ascertained by post-mortem examination to have been apoplexy. The medical man who attended the deceased, and gave evidence at the inquest, was of opinion that no treatment could have saved his life—a view which is probably correct, but withal one upon which no one would at an earlier stage have thought of acting. The jury added to their verdict of "Death from apoplexy" a rider which the circumstances of the case abundantly justified, that "the deceased was not intoxicated at the time of his seizure. They regretted that a medical opinion was not obtained on his arrival at the station, but they believed that the inspector was misled by the symptoms exhibited by the deceased, which equally resembled the effects of intoxication, and there were no external injuries which required the presence of the police-surgeon, according to the regulations."

ALCOHOL AND LONGEVITY.

WE have received in addition to the letter which we to-day publish from Mr. Hardy, a long communication from Mr. Sers, in which that gentleman insists upon his view that the comparative mortality of temperance and general sections in life assurance statistics is to be explained by incidental conditions, the result of a form of natural selection. Interesting as these speculations are we are compelled by the limits of our space to refer to them in this compendious way. The discussion, though of the highest importance, will now have to await the disclosure of fresh facts upon the footing of which new theories may possibly be admissible.

THE RED CROSS IN THE CONGO.

STEP by step the Dark Continent is being invaded by European institutions, the latest and (in its collateral working) not the least salutary of which is that of the Society in Aid of the Wounded in War. The Société Congolaise, which has its headquarters at Brussels, has just hoisted the sign of the Red Cross in the Congo—a State neutral, no doubt, and, therefore, little likely to furnish much scope for the Society's beneficent work. But among its normal developments the Red Cross movement takes cognisance of the sanitary needs of localities where even internal disturbances may lead to sanguinary collisions, and in the founding of local hospitals it prepares institutions which, useful in time of peace, may prove handy, when least expected, on the outbreak of war. This laudable development is the result of deliberate study—deliberate enough to have already designed plans for such hospitals,—and only the scantiness of funds has hitherto prevented its more speedy and more extended realisation. In the Congo, a first sanatorium has just been opened at Boma, the headquarters of the Central administration of the State. This has been destined for Europeans only, and bears the name of "Ambulance Anversoise," or Antwerp Ambulance, the subcommittee of Antwerp having taken in hand the construction and maintenance of the pavilion or initial section of the ambulance, to which other sections will eventually be added. The subcommittee, moreover, has not lost sight of the blacks, for whom, indeed, it has in contemplation a special establishment, situated, however, at another point of the territory. While European patients are accommodated in the above-mentioned pavilion near the sea, the view of which has a pleasant and exhilarating effect on them, the blacks, it has also been found, will be more appropriately housed at a distance from it, "the ocean inspiring them generally with an instinctive repulsion which the remembrance of the middle passage suffices to explain." In this forethought which consults even the prejudices due to not unnatural association on the part of the sick man, the subcommittee reveal the care with which their enterprise has been set on foot, and which, exemplified as it is in other and more fundamental details, cannot fail to reap its well-merited reward.

A NORWEGIAN NOVEL.

AMONG the many books of the present day introducing a semblance of medical and pseudo-scientific matters, it is pleasing to turn to a work which will repay perusal and be found entertaining to many of our readers, especially in the present holiday season. We refer to an English translation of a Norwegian novel by Björnsen, "In God's Way." Not only is it a simple and consistent story of Norwegian life by one of the leading novelists of that country, written in a most interesting manner, and abounding with charming word pictures of life and scenes, but the character of the young doctor gives opportunities for unusually accurate accounts of the resources of medical and surgical treatment, and shows a pleasing picture of professional intercourse.

SPLENIC ABSCESS OPENING INTO BOTH THE LUNGS AND THE BOWEL.

AN interesting case of abscess of the spleen is related in *La Crónica Médica*, a Peruvian journal, which occurred in the Lima Hospital under the care of Dr. R. Quiroga y Mena. The patient was a lad of sixteen, who had been suffering from attacks of malarial fever, which had been followed by enlargement of the spleen, of which the patient was conscious. In this condition he had a fall from his horse, striking his left side against a stone. He was brought into hospital on Sept. 3rd, 1890, and when examined the next day was found to have the signs of pneumonia of the left base, together with a large fluctuating tumour of the spleen; the pulse and respiration were somewhat rapid, and the temperature 39·5° C. It was decided to aspirate the following day. However, during the night the patient had two violent attacks of coughing, bringing up large quantities of puriform matter of a dark colour like the dregs of wine, which appeared to have come from the spleen, as the tumour, which had measured about 3½ in. by 2½ in., had completely disappeared. The patient, too, seemed quieter and better generally, and the proposed operation was abandoned as needless. A blister was, however, applied, and a tonic mixture ordered. The next night a stool was passed containing purulent matter of the same colour as that evacuated by the mouth. During the next three months this matter continued to be discharged both through the respiratory passages and by the bowels, setting up at times a certain amount of diarrhœa. After that there was great improvement, both discharges gradually ceasing, and the patient was able to leave the hospital about eighteen weeks after admission, quite recovered.

BY Reuter's express comes the information that the Cape House of Assembly has passed the first reading of the Bill to amend the law relating to leprosy.

IT is rumoured that a memorial is about to be presented to the United States Congress asking for the creation of a Government Department of Public Health, with a Cabinet officer at its head, to be known as the Medical Secretary of Public Health.

THE Royal Colleges of Physicians and Surgeons of Ireland propose to discontinue after October 30th, 1891, the granting of their separate diplomas in Public Health and continue the Conjoint Examination for the Diploma in State Medicine only.

THE

INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

ARRIVAL OF THE FOREIGN DELEGATES.

ON Saturday evening, the 8th inst., there were already a few foreign delegates, wandering about principally in the neighbourhood of Regent-street, seeking out old friends just arrived from the Continent. By Sunday morning the number was more considerable. Of course they hastened to the offices of the Congress at 20, Hanover-square, eager to claim their letters and to receive news from the homes they had left. They had not, however, calculated with the British sabbath. The doors at Hanover-square were hermetically closed. The delegates consequently repaired to Burlington House, but here also the big iron gates that protect the entrance on the Piccadilly side were shut and barred. Disappointed, some not a little anxious and disturbed, the delegates one by one gravitated towards a well-known French café in London. This establishment, being close at hand, became accidentally the meeting-place of many of the foreign members. Early the next day the foreign delegates were afoot, congratulated each other on the fact that it was no longer Sunday, and returned to Burlington House. Here they found a scene of great confusion. A sort of bar had been built in the centre of the large reception-room. Within, post-office clerks and members of the Organising Committee struggled in vain to satisfy the clamorous demands of hundreds of persons who, in a great variety of tongues, claimed papers, letters, cards of invitation, guide-books, circulars, and every conceivable form of document. There was a great want of interpreters. Some interpreters had been provided, but they could not be everywhere at one and the same time. A lady, in her zeal to be of help, decorated herself with two rosettes, one composed of the German colours and the other of the French colours. This was intended to convey the idea that the lady in question was equally conversant with both the French and the German languages. But it did not work well, for the French were kept at a distance by the German colours, and the Germans did not like to appeal to the wearer of the French rosette.

The greatest eagerness was shown to obtain the card of invitation for the Lord Mayor's reception. Little or nothing was known about the other preparations and entertainments. "Where ought we to go?" was the general question; but about the Lord Mayor there was no hesitation, the only difficulty was to get a ticket. These tickets soon ran short, and then there were cries of distress, protestations, and appeals. Finally it was announced that there would be a ballot for the few remaining tickets. It would have been preferable if the English members only had been admitted to the ballot, and all the foreign members without exception had received the invitations. At last the delegates returned homewards and prepared for the afternoon's ceremony. The greater part of the French delegates were called away earlier, a meeting having been summoned at the residence of Dr. Vintras, where the attitude that the French delegation should observe was discussed.

Dr. Brouardel was elected to the chair, and of course there were many protests made by the delegates who had not received their cards. Some twenty to thirty who had sent their subscriptions late, or brought their entrance fees with them, were much surprised to find that they could not receive the same documents as those who had taken the precaution to follow the printed regulations, and put themselves in order some weeks in advance. More serious than this was the fact, which we have ourselves pointed out many times, that the Congress does not meet long enough to seriously and usefully discuss the questions inserted on the agenda. Many delegates expressed the opinion that it was hardly worth while attending the meetings of the Sections, and that the time would perhaps be better employed visiting the various institutions of technical interest. The French delegates were particularly moved on the question of the quarantine debate. Dr. Proust, who is the leader in this matter, had not yet arrived, and it was suggested it was no use his taking the trouble to come, as he would certainly not be allowed time to explain himself. This is to many delegates a very serious matter. Their expenses are paid out of the public purse. They have an account to render to their electors, and if they have spent the voters' money they must show that they have done good work. But how is it possible to do good work when all the business has to be crowded into sixteen brief hours? Still, we are confident that all shortcomings will be forgiven in the face of the wonderful success of the Congress. No less than 3200 persons have taken out their tickets of membership. The Organising Committee are not composed of generals that they should be able successfully to organise so vast an army. Our foreign guests will make allowances for the difficulties arising out of the immensity of the success. We must congratulate the Congress on the wide interest it has excited, on the vast propaganda achieved in the cause of hygiene—that is, of human health and happiness.

OPENING MEETING AT ST. JAMES'S HALL.

Early on Monday afternoon, and long before the appointed time, members and a very large number of ladies began to gather round the doors of St. James's Hall. Those who came early, especially if they possessed platform seats, were fortunate, for this privileged place was soon overcrowded; and, indeed, the great hall itself was ultimately filled to overflowing. Several distinguished foreign delegates were not able to gain admission at all, and were consequently highly indignant. In this respect there were several regrettable but perhaps unavoidable oversights. Dr. Lavraud, for instance, the President of the Paris Municipal Council, was perched up aloft in a back seat. Certainly the Lord Mayor of London would have met with far more consideration in France, and instead of a seat in the gallery would have had a front row on the platform. Prominent places should have been given to foreign Government or municipal delegates who hold prominent and responsible positions.

In spite of these mistakes and drawbacks the great hall presented a very imposing sight when the organ peeled forth the National Anthem, and the entire vast assembly rose to salute the entry of the Prince of Wales. So many upturned faces, all earnest, all silent, all thoughtful, formed a great sea of humanity. Certainly the sight was impressive, for there were assembled, close to each other, men and women eminent in their scientific attainments, in the services they have rendered to humanity, and potential in the power they wield for the achievement of good. The solemn tones of the organ subsided, and with a sound of rustling of dresses the audience was once more seated.

H.R.H. the Prince of Wales, the President of the Congress, took the chair at three o'clock. His Royal Highness was conducted on to the platform by Sir Douglas Galton and other members of the Organising Committee. The Prince was very cordially received by the vast audience, who remained standing while a verse of the National Anthem was played on the organ.

The President first of all called upon Dr. G. V. Poore, Honorary Secretary-General, who announced that intimations of inability to be present had been received from the following Vice-Presidents: their Royal Highnesses the Duke of Edinburgh, the Duke of Connaught, the Duke of Clarence and Avondale, the Duke of Cambridge, and Prince Christian; the Duke of Westminster, Mr. C. T. Ritchie, M.P. (President of the Local Government Board),

Mr. H. Chaplin, M.P. (President of the Board of Agriculture), Sir John Lubbock, M.P., Sir William Jenner, and Sir John Simon.

Sir DOUGLAS GALTON, who was next called upon, said: As the mouthpiece of the Permanent International Committee of the Congress, which was appointed at Vienna, I have the honour to present to your Royal Highness the report of that committee. I will not trouble your Royal Highness by reading it, as it involves a number of technical matters, but I should like to say that this Congress, which has had the advantage of being presided over by your Royal Highness, has in consequence of that received a degree of support from England and the British empire which is unparalleled. (Applause.) I believe this Congress numbers more at present than any previous Congress. We have delegates from almost every important country in the world. We have also delegates from many British colonies; but I would especially desire to emphasise that we have received a very large support from the British Indian Empire. We have received very large subscriptions from the various Indian Princes, and we have about seventy delegates from India, many of whom are non-official delegates. I believe it is the first time in the history of this Congress, and even in the history of other Congresses, that India has contributed so largely to meetings of this nature held in Europe. The Organising Committee have endeavoured to do all in their power to make the Congress a success, and if there are any shortcomings from the immense number of people who have come here to-day, rather overwhelming us at first, we trust we shall be able to remedy it before the end of the Congress.

His Royal Highness, as President, then rose to deliver his inaugural address, and was received with prolonged applause. He said:—

Sir Douglas Galton, Ladies, and Gentlemen,—It gives me great pleasure to open the proceedings of this Congress, and to offer a hearty greeting to all its members, especially to those whom it has induced to come from distant countries. Many as have been the meetings for good purposes over which it has been my good fortune to preside, there has very rarely, if ever, been one of which the object has been approved by a greater weight of authority. The importance of our Congress is proved, not only by the large number of members who have assembled here to-day, but by the names of those who are on the list of its officers, both honorary and active. Under the Queen's patronage this list includes, together with several members of my family, some of the principal members of Her Majesty's Government, the presidents of nearly all the medical corporations, representatives of the universities, and of the chief medical and scientific societies in the United Kingdom, delegates from nearly every great country in the world, and from all our sanitary institutions and medical schools, many official representatives of our colonies and India, the Lord Mayor and Sheriffs of the City of London, the Masters of several of the City companies, and a great majority of those who here or elsewhere have gained the highest renown in the study of public health or of the sciences most nearly allied to it. All these approve the design of the Congress, and they may well do so, for in so far as its object can be fulfilled it will everywhere bring good to all classes of society. As one looks through our programme it is impossible not to feel distress and even horror at the multitude of dangers to health in the midst of which we have to live. Some of them appear at present to be inevitable, but the great majority may certainly with due care be averted. I cannot pretend to be able to judge but of a few of these dangers, but I would take as examples those to which my attention was especially drawn when I was a member of the Royal Commission on the Dwellings of the Working Classes. I learned much there of the dangers to health which may be ascribed to the constant increase of our great manufactories, and to other industries, from which especially come the overcrowding of our towns, the building of huge factories, the pollution of our atmosphere, the accumulation of refuse, the fouling of rivers, the impurities of earth and air and water. I learned not only these dangers, but the immense difficulty of increasing, or even maintaining, our activity in all branches of trade without incurring heavy risk to health, more particularly in our chief centres of population. The task of averting them might have appeared hopeless, but I have rejoiced to see how much has already been done in diminishing them, and to observe how our registers bear witness to the decreasing mortality in our large towns, and to the increasing average length of life in the whole population, whilst many facts prove the good influence of our sanitary institutions. But on them I do not now propose to dwell. I will only conclude from them that the good already done, and the constantly increasing knowledge of the whole subject, may make us sure that much more good may still be attained, and that neither this nor any other nation should be content until prosperity in business and all other things desirable for the national welfare are made consistent with national good health. How the many dangers which our programme indicates may best be dealt with will of course be discussed in the several Sections. It will be no trivial work if their sources and probable remedies can be clearly pointed out, and especially if this can be done, as in a Congress such as this it should be, in a strictly scientific manner, calmly and dispassionately, without any reference to either general or municipal politics, or for any other purpose than the promotion of health. It is only on conviction such as may thus be produced that the appointed sanitary authorities can compel the changes necessary to be made; for such changes are almost always inconvenient or injurious to some, and might even seem unjust to them, unless it be made quite clear that they would be very beneficial to the community. But my hope is that the work of this Congress may not be limited to the influence which it may exercise on sanitary authorities. It will have a still better influence if it will teach all people in all classes of society how much everyone may do for the improvement of the sanitary conditions among which he has to live. I say distinctly "all classes," for although the heaviest penalties of insanitary arrangements fall on the poor, who are themselves least able to prevent or bear them, yet no class is free from their dangers or sufficiently careful to avert them. Where could one find a family which has not in some of its members suffered from typhoid fever, or diphtheria, or others of those illnesses which are especially called "preventable diseases"? Where is there a family in which it might not be asked, "If preventable, why not prevented?" I would add that the questions before the Congress, and in which all should take a personal interest, do not relate only to the prevention of death or of serious diseases, but to the maintenance of the conditions in which the greatest working power may be sustained. In this I include both mental and bodily power, for the highest possible prosperity must be when men and women of all classes, rich and poor alike, can safely do such good and useful work as they are fit for, and for which they are responsible to those among whom they live. To this end it is essential that they should enjoy the best possible health and vigour, and to obtain these it is necessary that everything possible should be done for the promotion and maintenance of the national health. Such then is to be your work: let me say our work; for though I cannot further contribute to the proceedings of the Congress, I shall watch them with much interest, and shall always strive to promote whatever may be here plainly shown to be useful for the public health.

The conclusion of the address was warmly applauded.

Dr. BROUARDEL, Dean of the Faculty of Medicine of Paris, was first called upon to reply to the address of the President, and spoke in French. He said:—In the name of the French members of the Congress of Hygiene and Demography, I offer our respectful homage to his Royal Highness the Prince of Wales. We pray that he will convey to Her Majesty the Queen of England the expression of our most heartfelt thanks. Her Majesty has graciously deigned to accord to this Congress her Royal patronage, and we hope that the work achieved by it will justify this mark of her gracious approbation. We are aware that in England public opinion is ready to second our efforts; we have a sure guarantee of this in the history of the last half-century. In the year 1837, the year of the coronation of Her Gracious Majesty, appeared the Act which rendered obligatory the registration of deaths. This Act inaugurated the era of administrative reforms concerning the public health, which our valued colleague of the Local Government Board has rightly called the "Victorian era." This Act did not long remain alone. Under the impulse given by two of your most illustrious patriots, William Farr and Edwin Chadwick, you have organised a system of registration of the causes of diseases and of deaths. Certain important cities—before the law made it obligatory—

obtained supplies of water beyond all suspicion of pollution, and adopted systems of removal of foul water and waste matters. In these cities, whose action cannot be too much praised, the sickness and death-rates diminished rapidly; this furnished the necessary proof—it was time for reform. Twenty years ago the Local Government Board was established, and in 1875 had submitted to Parliament a Bill for the protection of the public health. During its discussion in Parliament one of your greatest Ministers (Disraeli) pronounced in the House of Commons these memorable words, which should be repeated in all countries and in all parliaments: "The public health is the foundation on which repose the happiness of the people and the power of a country. The care of the public health is the first duty of a statesman." Each year since then you have made fresh improvements in your sanitary laws; if in your eyes they are not perfect, in the eyes of the nations who surround you they are an ideal towards which all their most ardent aspirations tend. It is your example they invoke when they claim from the public authorities the powers necessary to oppose epidemics, to combat the scourges which decimate their populations. You have taken the first rank in the art of formulating laws for the protection of health; this is not all that you have done in the domain of hygiene. Among the diseases which one may properly term pestilential, there are, thanks to the work of the hygienists of all countries, certain ones which from the present time may be considered as preventable; such are small-pox, typhoid fever, dysentery, and cholera. For one of these, the most terrible, the immunity conferred by vaccination is absolute. The person upon whom this immunity is conferred can pass through the most severe epidemics and expose himself to all sources of contagion without being affected. Who is it who thus preserves from death, from blindness, from infirmity, millions of human beings of all countries and of all races? On the 18th May, 1796, a date which might well be the date of a great battle, Jenner inoculated with vaccine matter by means of two superficial incisions the youth James Phipps. Protection against small-pox belongs to you; the world will be to you for ever obliged. Let us consider two other epidemic diseases. Is it possible to establish the conditions of the propagation of typhoid fever without quoting the names of Budd and of Murchison? I am aware that in 1855 Dr. Michel de Chaumont had for the town in which he lived established the *rôle* played by drinking-water in the propagation of this disease; unhappily public opinion was not prepared, and his discovery was not listened to. In the work which we are considering the efforts of the English school were most fruitful. May I recall the fact that it was the epidemic of cholera in 1866 in England which gave birth to the theory of its propagation by drinking-water? Was it not at that date that, under the influence of your hygienists, Radcliffe and Simon, the Lords of the Privy Council issued an order formulating the laws of prevention which we adopt to-day? Certain it is that even in England these discoveries have not immediately borne all their fruit. The anti-vaccination leagues are not yet dead. Proofs accumulated during a century have not sufficed to open all eyes; it is not only physically that persons are born blind. After the enthusiasm which each discovery receives come the difficulties of application, doubts, reactions. In the country of the great Harvey it is not necessary to recall the laws which govern the human mind. Has the glory of him who discovered the circulation of the blood been lessened by the rudeness of strife? Be assured that that of the English hygienists will survive present difficulties. It will survive, because the benefit derived from these discoveries is international, and is not limited to a single people. We all of us praise the success of our neighbours; we know that our compatriots will find in it an advantage to their comfort, their health, and their lives. In this career there are rivals, but not enemies. But if the benefit is to all, the glory is to one alone, and that country has the right to be proud of the moral authority which the genius of one of her children gives her. For the last fifteen years medical doctrines, especially those most concerned with hygiene, have undergone a revolution which surpasses in importance all those of which history has taken notice. Can France be represented in a Congress of Hygiene without recalling the name of M. Pasteur? For centuries we have asserted that epidemic diseases were propagated by means of contact, by the air, by effluvia, by miasmata. The idea of morbific germs, if not the name, is even found in the works of Hippocrates, but in what an uncertain sense. The theory of contagion has passed from century to century with strange modifications; the uncertainty of the methods of research and the difficulties of observation bound up together truth and error. It remained for Pasteur to prove the existence of these germs, their form, their life, their mode of action, and by their attenuation to solve the problem of immunity. Thanks to his works, and thanks to those of his pupils, realities have succeeded to contingent possibilities. We know some of our enemies, their habits, and their mode of penetrating the body; up to this time man was conquered by these infinitesimal beings, but thanks to recent discoveries he will be their conqueror. When at the beginning of a century one can inscribe the name of Jenner, and at its end that of Pasteur, the human race may rejoice; more has been done for it against misery, disease, and death than in any one of the centuries which have preceded it. You, gentlemen, have been the imitators; this title will never be disputed with you. When a great people has given such an example; when, by her gracious patronage, Her Majesty the Queen, and when, by his presence, His Royal Highness the Prince of Wales, testify that for them this era of reforms is not closed, it is only right that those who try to imitate them, and to give their country similar institutions, should come to bring to that people and to their Sovereign the homage of their profound respect. Gentlemen, I will finish by addressing to the City of London our sincere thanks for the gracious reception which she has given to her guests. Thanks to you, we shall bring together here an association of ideas and of men. This task will be made easy for us by the preparations of the Organising Committee. If the success of the Congress answers, as I have no doubt that it will, to our expectations, it is to the Organising Committee that we must assign the honour. We beg Dr. Corfield, who has undertaken the laborious task of conducting the foreign secretarial work of the Congress, to accept our personal thanks. Gentlemen, France hopes that the London Congress will occupy a place of honour in the lists of the Congresses of Hygiene.

DR. VON COLER, Director General of the Medical Department of the Prussian Army, who addressed the assembly in German, spoke as follows: Charged by the German Governments, especially by that of Prussia, and in the name of all those from the German Empire, who, with me, followed your call to the Congress, I have to offer you the warmest thanks for your kind invitation, and I need hardly add how highly I appreciate the great honour thus conferred upon me. The great number of delegates alone who have been sent from my native country to attend this Congress clearly proves the lively interest felt at home in all the tasks and future resolutions of this distinguished assembly. Indeed, it is with a feeling of joyous pride, if from this place and in this country, where we have to trace the very cradle of all modern science of public health, I am permitted to point out how the many efforts made in the direction of hygiene, radiating from England, were especially in Germany hailed with much delight, where they received the most careful attention, and where they have ever since been most actively promoted. And for all that has been done in this domain there existed some very sound reasons. Mankind has to resist in a continual struggle the forces of nature, the subjection of which forms, after all, the final aim of all human efforts. In fact, the highest degree of culture is only to be found where man has, in the most perfect manner, succeeded to subject nature by an intimate union of human genius and force. But in that formidable struggle it is again the science of hygiene which forges for the fighter for culture and civilisation the most efficacious weapons. Of eminent usefulness, refreshing, and invigorating is the spring which gently flows from the bosom of every science; but so full of blessings, so benefiting to the common welfare and to individual happiness, scarcely another science exists than that of hygiene. Germany has herself gone through that experience. Yes, could I lead you from our most magnificent palaces to the most humble homesteads of the toiler, show to you the arrangements of our metropolis and those of a lonely workman's shop—all and everywhere the observing eye would meet with valuable hygienic efforts and improvements, all serving to benefit the single individual as well as the community. The dearest to the heart of the German nation is its army, formed by the sons from all ranks of the people. And it is this grand institution which, independent of a rarely occurring war—in times of peace and for the furtherance of peaceful purposes—has become

the national school of physical and intellectual development, a source of the highest virtues of mind and body, a source of our sublimest ideals. It is in this fine national institution where the blessings of hygienic science have abundantly been received, where the greatest success of hygiene may daily be distinctly observed. We must thank, above all, hygiene and her teachings that it has been possible to considerably lessen from year to year the number of patients in the army, and to reduce the number of deaths to a minimum. Indeed, I can affirm that in the years 1888 and 1889 alone, 79,500 men less applied for surgical or medical treatment than we could expect when judging from the average of the ten preceding years. Consequently many hundred thousands of days of sickness, which formerly had to be passed under medical treatment, have now been won for better physical and intellectual education of the man. The death-rate has sunk by two-thirds in the same time (from 6·9 per cent. in 1868 to 2·3 per cent. of the present force in 1888–89), and during the last year we counted at least 1500 deaths less than in 1868, comparing these figures with the numerical strength of the army of the present day and of that year. What an amount of national well-being and human happiness we trace in summing up these events! Every single man, when he attained the age to serve in the army, represents a pretty fair-sized capital, which to secure in the national interest has been the successful task of hygiene. And incalculable are the beneficial consequences which lay in the fact that in every year ten thousand of our men more remain now healthy and free from germs of disease—men who, after completion of their military services, return home, peacefully settle down, and offer in their robust state of health the best guarantees of becoming fathers of a healthy rising family. Verily, considered in this light, the costs for hygienic arrangements are through the fruits they bear more than a hundredfold repaid, a fact to which already some years ago an illustrious *savant* of this country especially alluded in a letter to the August Empress and Queen Frederick, who had early devoted her deep interest and gave her highest patronage to hygiene. And further, the question may be raised whether, in consideration of the blessings a nation undoubtedly receives through keeping such a national army, that makes every single man strong in health, nationally educates him to improve his mind and body, and raises him to a higher standard of intelligence, carefully trains him to increase his physical powers, abilities, and efficiencies, which in after life must help such men to follow their civil occupation on a sound basis, and for a prolonged number of years—whether those immense national advantages do not by far outweigh the sums necessary for the maintenance of such an army? If from our army, diseases like malaria, small-pox, dysentery, have completely or almost completely disappeared, if typhoid fever and trachoma become more and more diseases of the past, we have to be thankful for those attainments to the developement and appliances of hygiene under this reign of His Majesty the Emperor and King William II. who, with a truly royal heart and a strong determination, secured for hygiene in our country the rightly deserved place. The most magnificent results have crowned this work, results which until recently were thought to be almost impossible to attain. Proved by experience, it is now an established fact, that infecting diseases are by no means a necessary evil in the army. They are simply diseases which can be avoided, which can be powerfully opposed and against which the science of our days battles victoriously with ever-increasing success. From this experience and conviction that, like in our German army and in the German empire, the juvenile goddess Hygiene will, all and everywhere, become a lavishing benefactress and friend to mankind, results the highest appreciation with which we hail her glorious science and her congresses. We have, therefore, with a joyous and thankful heart followed your call to coöperate with you on the path of an international exchange of knowledge and experience, and to give our help to the solution of all still open sanitary questions. We all fervently hope that the councils and resolutions of this Congress may lead to the advancement of science, to the happiness of men, and to the glory of this great and hospitable country.

Professor CORRADI of Pavia followed. He spoke in Italian, and the following is a translation of his remarks: Your Royal Highness, Ladies, and Gentlemen,—I bring you the homage and the salutations of Italy. Ancient are the chains which bind my country with England, and science has made them more lasting. Lanfranc of Pavia and Anslem of Aosta restored in the eleventh century learning to Canterbury, and from among the students of our Universities the English nation took them. But already Robert of Anglia was among the rectors who opened in the year 1205 our University at Vicenza, having removed from Bologna, where a little while before the poet Gualfrido had taught literature with great success, and where a little afterwards Alano, the universal doctor, rendered famous the chair of canonical law. The teachings and the discipline of the Italian schools entered with scholars, become teachers, into Oxford and Cambridge, and the traditions were maintained. But if these had become chains of habit, a more intimate connexion followed in the sixteenth century. William Harvey reunited indissolubly in the field of science the names of the two nations by giving the demonstrations of a fact of which in the Anatomical School of Pavia the fundamental principles were found; but instead of partial, portions and scattered, or uncertain ideas, he evolved a complete system under which all is known in the greatest simplicity. The discovery of the circulation of the blood is the most solemn testimony that one begins great things and another finishes them. This remarkable event signalised one of the greatest moments in the history of science, not only by the fact itself, but by the new spirit which it infuses into biology, in which is the foundation of hygiene. Moreover, to recall here the names of the Doctor of Folkestone and of the Hospital of St. Bartholomew, the "Stator Perpetuous" of the Royal College of Physicians of London, is to augur well of the Seventh International Congress of Hygiene; the glory of Harvey is reflected upon his predecessors, his masters; to salute him is to salute both Italy and England, who affectionately join in celebrating his immortal name.

M. JOSEPH KÖRÖSI, Director of Municipal Statistics of Buda-Pesth, after a few preliminary remarks in Hungarian, proceeded as follows, amid applause, in English: As a representative of statistical demography in Austro-Hungary, I beg to be allowed to express in a few words our sense of deep gratitude for the honour which has been bestowed upon us by the patronage of Her Majesty the Queen, and by the presidency of His Royal Highness the Prince of Wales. It is not for the first time that the representatives of statistical science have been called upon to meet under the patronage of your great Queen, and to work under the protection of her illustrious throne. Thirty years have passed since the International Statistical Congress met in this hospitable town to do its fruitful work. Your place, your Royal Highness, was taken then by your illustrious father, who spoke to us those ever-memorable words of wisdom and benevolence which have shone upon the path of statistical science ever since, and which are still gratefully remembered by us. While deeply moved by gratitude towards our Royal President for the interest taken by him in our work, we cherish in our hearts as well the memory of the illustrious deceased. But it is not to single persons that our gratitude is due; we have to thank all England, the genius of the great English nation, for it is England whom among all nations of the world we must consider the mother country of statistics, especially of demography. This branch of science, the very nucleus of statistical work, which, in fact, is quite a science in its own right, has chosen the task of investigating the laws which regulate the life, increase, and decrease of nations. Its work, therefore, comprises three main parts: statistics of natality, of mortality (this part including biometry, the science of measuring the duration of human life), and of the increase of population. And when inquiring now who were the founders of this new science, we shall hear unanimously quoted the names of England's sons—Graunt, Petty, Halley, Malthus. Gentlemen, to-morrow, when we begin our work, we shall meet within the venerable hall of the Royal Society. It was in the old room of this Society, then in its very first youth, but soon rendered conspicuous to the world by the genius of Newton, that Graunt, 230 years ago, established for the first time the problems of demography, and that the king himself, admirably appreciating the work done, recommended that the author should be received as a member of the learned Society. The Congress of Hygiene and Demography will continue his work on the very birthplace of demography. It was there that, shortly afterwards, Sir William Petty, by the eminent power of his genius,

raised the new science to political importance and to popularity, and it was again there that in 1693 the famous Halley became the founder of biometry, the most important part of demography, by working out the first "table of mortality." And now the young science, which two centuries ago left those halls shy, and even without a name, passing through the world under the pseudonym of "political arithmetic," has found its way over the whole globe. Having been worked out in Germany, having received a name and new ideas in France, and having been enlarged and imbued with a more scientific character in Belgium by Quetelet, having got its well-equipped offices in every country of the civilised world, we are proud to see its numerous representatives meet at the same place where two centuries ago the science was born. Yes, after a triumphant career of 230 years it returns to its home, in which it awoke to light, and again the throne of England receives it with favour and benevolent interest. For demographic not less than for all statistical work it is of the highest importance that its representatives, scattered as they are over the whole globe, should fully understand each other, for only so can we accomplish what we aim at, that our observations may comprise equally all countries of the world, that our researches may be conducted and worked out on the same principles everywhere, and that we may combine the incomplete and often discrepant observations of single nations in a full descriptive history of all civilised mankind. This was the highest aim of the past Statistical Congresses; this was the chief inheritance of the following Demographical Congresses and the International Institute of Statistics, and it must be recognised that both scientific bodies have done a great deal for the unification of demographical statistics, and especially for that of census results. This great aim fully deserves the praise the illustrious Prince Consort bestowed upon it thirty years ago. He said: "The importance of Congresses cannot be overrated; they not only awaken public attention to the value of these pursuits and bring together men of all countries who devote their lives to them, and who are thus enabled to exchange their thoughts and varied experiences, but they pave the way to an agreement among different Governments and nations to follow up these common inquiries in a common spirit by a common method and for a common end." May we, the statisticians of a second generation, add a little during this Congress to the great international work before us, and may to our successors the memory of this Congress and the name of its Royal President be as dear to us as is the memory of the former Congress and its illustrious President.

Dr. W. ROTH, Surgeon-General of the Army of Saxony, next spoke. He said: It is with the greatest pleasure that I comply with the request to address this meeting on behalf of the German Committee for the International Congress of Hygiene. A hygienic congress in England is an event strikingly in accordance with the character of English life. It is unquestionable that, in the whole field of hygiene, England has been foremost in practical work, thanks to the great number of eminent men who have devoted their powers to this subject. But while fully acknowledging the prevalent importance of their work, it must be confessed that it is the wealth of this great country which enabled them to create their sanitary institutions we have before us, and the gigantic scale of which is a surprise to us. It is quite a peculiarity to England to conduct experimental researches on a grand scale, and we may say truly that England saves us the trouble of experimental investigation. And while we in Germany fully acknowledge the splendid sanitary work done in England, we cannot fail to see how all the work in this branch of science is facilitated by the character of the English people, who, conservative as they are, apply themselves zealously to everything new the practical necessity of which they are convinced of, and do away with all minor obstacles, especially the financial ones. No book-reading can give us a full idea; we have to come and look ourselves, to become acquainted with the numerous institutions devoted to the welfare of mankind and to get familiar with the great questions of self-government, the deficiencies of which, especially the frequently contradictory character of its local institutions, we must, however, not overlook. Certainly it is with the highest interest that we study the institutions of England. But as well as the practical work done in England, we have to admire the progress in the science of hygiene, flourishing in England at a time when the German Universities just began to give their attention to the subject. We are in duty bound gratefully to acknowledge the great progress in the science of hygiene, which is due to the influence of the school at Netley. And of the many eminent men who worked there I mention one, who is no longer among us, but whose memory will be dear to everyone who takes an interest in the welfare of our soldiers and in the progress of our science—Edward Alexander Parkes. Till his death in 1876 his lectures at Netley attracted all those who took an active interest in the progress of hygiene. A man of the highest faculties, with an almost womanly tenderness of heart, and with the purity of a child, he was sure to make the deepest impression upon his fellow workers. A lasting monument of Parkes is his "Manual of Practical Hygiene," which has become the base for extensive hygienic work. And we must not forget to mention his friend and successor, De Chaumont, who proved to be his best fellow worker, and who did some eminent work in questions of practical hygiene. On this important occasion I thought it right to recall the memory of these two eminent workers in our branch of science. I conclude by expressing the wish that it will be the spirit of Parkes which will guide the transactions of this Congress. The Parkes Museum was the first institution to allow of a practical instruction in hygiene; at the same time it shows what his ideas, his aims, were as to the generalisation of hygienic knowledge. May this Congress follow his steps, and may its work tend to impart to wider and wider circles that which Parkes called the aim of his life—purity and light.

Sir JAMES PAGET then rose, and begged to propose to the assembled members of the Congress that they should offer their most cordial thanks to His Royal Highness for his kindness in accepting the office of President, and for the manner in which he had conducted the business that day. He knew his proposal would be heartily accepted by all present, but none knew better than he did the immense advantage that the Congress might derive from His Royal Highness being President. None could remember more clearly than he could the great advantage which was derived by the International Medical Congress in 1881 from His Royal Highness's presence at the first day of its meeting. His Royal Highness might very well speak with approval of the purpose this conference had in view, for if one here might define, or attempt to define, that purpose, it would be nothing less than endeavouring to find or develop the means by which the population of every nation in the world may attain as soon as possible the highest possible level of health, both of body and of mind. He ventured to think that the method in which the Congress was called together and planned to do its work might fairly also meet with His Royal Highness's approval. He could not tell the whole method of its work, but this thing struck him as a leading feature of it. Not being himself a worker in sanitary affairs, unless it had been in connexion with the work of some Royal Commission, but as a mere looker on he could not but see that there had been always the need that sanitary science should call to its aid and hold together the best knowledge that could be obtained in every branch of medical science. That was clearly shown in the construction of the Congress at present, in the large number of its sections, and in the wide variety of the work it had undertaken, every section having to understand that it meets only as a part of one great design, which was to work in accord with all others and under the criticism of every other division of the Congress. It was only what one who watched the course of medical science could not but feel to be constantly necessary. Than the constant tendency to divide the work, and to hold that each section of study was sufficient to accomplish all that was required, no error could be more mischievous. Every section of learning must be subject to the criticism of every other, and ready to work in accord with all others to a common end. This was very well shown not only in the width, but in the variety of the subjects to be dealt with by the Congress; and as one looked through them he could not help thinking that those who called themselves practical men might conclude that there was a good deal in them which could not result in anything like utility. The whole history of science would show that the highest utility had only been derived from the profoundest depths of scientific researches. M. Brouardel had referred to the work of Pasteur, to whom we owed the greatest advance made in modern times in hygienic knowledge.

But who would have ever guessed that that knowledge would have come from the beginning of his work, which was a research into alcoholic fermentation? To him they owed the origin of two of the sections of the Congress—bacteriology and preventive medicine—and they might reasonably begin to hope that the time had come when they would lead us to such a knowledge of the methods of cultivating and taming, if he might say so, some of the worst diseases, that to our successors they might be comparatively harmless. He would note the necessity of the pursuit of the most scientific subjects as tending naturally to the improvement of health as a motive why Governments might well encourage investigation of such subjects. Already excellent work had been done in this direction in connexion with the Local Government Board under Sir John Simon and Dr. Buchanan. Much remained to be done, and it would be well if the unanimous voice of this Congress should make it clear to every Government in the world that it was part of its duty to promote the cultivation of the deepest science as much as the ordinary routine of sanitary improvement.

Dr. BUCHANAN, in seconding the motion, said they all, of whatever country, who gave their lives to the promotion of sanitary medicine as a profession were particularly grateful to His Royal Highness for his approval upon this occasion. They had much to do in the way of comparing notes and learning from each other, and they trusted they might on this occasion make some progress in their common knowledge of sanitary matters. They should be encouraged materially in their work by their President's approval, and they should go to work with the object of making the Congress of 1891 an epoch in the progress of sanitary medicine and human welfare.

The motion was passed with much enthusiasm, the entire audience upstanding.

The PRESIDENT, who was again very cordially received on rising to respond, said: Ladies and gentlemen,—If I have to undergo the ordeal of returning thanks for the proposal that has just been made to you, that ordeal has been made a very pleasant one by the very kind terms in which my old and valued friend Sir James Paget has proposed this vote. To you I make also my most sincere acknowledgments for the hearty way in which you have received it. We have all heard with the deepest interest the addresses which have fallen from the lips of those distinguished foreign delegates who have spoken to-day. Those who are familiar with the languages in which they spoke cannot but have been deeply impressed with what they said. It would be superfluous in me if, to use such a term, I were to "hark back" in any way with regard to the subjects which are before the Congress, or to allude further to what I have had the honour of saying, or to add to what you have heard from the lips of very eminent men to-day. But I most heartily congratulate this Congress and the large attendance hereon what I regard as an augury of the work before them. Although the time before the Congress is unfortunately not long, I am sure we have every reason to be very grateful to those distinguished men who have come here from different countries of the world to be with us to-day, and who intend to give their valuable assistance during the work of the Congress. I feel very little doubt, although, perhaps, the outside public have occasionally sneered at the word "congress," but that from the interchange of ideas between ourselves and our foreign friends, and the matters of importance that will be discussed, if we can only arrive at a just conclusion which may be beneficial, not only to our own country and our own cities, but to the cities of other countries, by producing such sanitary measures as will decrease disease throughout the world, we shall, indeed, have lost no time in the work we are going through this week.

As His Royal Highness left the hall the organist played "God bless the Prince of Wales."

SOCIAL GATHERINGS.

DINNER BY SIR ANDREW CLARK.

The first of the social functions of the Congress was a dinner given on Monday, Aug. 10th, by Sir Andrew Clark at the Royal College of Physicians, "to have the honour of meeting his Royal Highness the Prince of Wales." After an excellent and well-served dinner, the toast of "Her Majesty the Queen" was proposed by Sir Andrew Clark and most cordially honoured by all present. Sir Andrew Clark then gave "Their Royal Highnesses the Prince and Princess of Wales," and, in the course of a speech delivered in his usual felicitous and able manner, remarked that the Prince had shown the great interest he took in the Congress by materially shortening his holiday and coming to London to give strength and encouragement to the Congress by presiding over the opening meeting. His Royal Highness, in replying, alluded to the time, now twenty years since, when he himself had been a victim to insanitary surroundings, and bore testimony to the services rendered him "by the late lamented and ever to be regretted Sir William Gull, and by one still happily with us and present to-night—Sir James Paget." The toast of "The International Congress of Hygiene and Demography" was then proposed by Sir Joseph Fayrer, and acknowledged in an eloquent and graceful speech delivered in French by Dr. Brouardel. Sir Douglas Galton, who also replied, incidentally mentioned that the Congress then numbered some 3000 members, an announcement received with much applause. M. Gennadius (the Greek Minister) having in accurate, and indeed in idiomatic, English proposed the "Health of the Host of the evening," and Sir Andrew Clark having suitably replied, the guests departed, many of them proceeding to the conversazione at the College of Surgeons. As will be noticed, the toast list was a short one; we may add that the speeches also lost none of their effect by being in every instance most commendably brief. The Royal Artillery string band played a selection of music during dinner. Covers were laid for the following:—Sir Andrew Clark (in the chair), H.R.H. the Prince of Wales, M. Gennadius, Earl of Feversham, Earl of Meath, Lord Basing, Lord Wantage, Archdeacon Farrar, Sir James Paget, Dr. Brouardel, Dr. von Coler, the Lord Mayor, Sir Spencer Wells, Sir Joseph Lister, Dr. Körösi, Sir R. Rawlinson, Dr. Ruysch, Sir Douglas Galton, Sir R. Quain, Sir W. Mackinnon (Director-General of the Army Medical Department), Sir John Banks, Lieutenant-Colonel Dr. Woodhull, Dr. Sell, Sir Joseph Fayrer, Dr. T. Grainger Stewart (President of the Royal College of Physicians, Edinburgh), Dr. Beco, Sir Owen Tudor Burne, Sir Nigel Kingscote, Sir John Coode, Sir Donald Smith, Mr. Bryant (President of the Royal College of Surgeons), Sir Risdon Bennett, Dr. Max Gruber, M. Bergeron, Mr. Dick, C.B. (Director-General of the Medical Department, Royal Navy), Sir Edward Sieveking, Sir Charles Cameron, Professor Fodor, Sir H. Roscoe, Sir E. Saunders, Mr. Bhownaggree, Mr. Lambert, C.B., Dr. Thorne Thorne, Dr. Perry, Mr. Diggle, Dr. Covernton, M. Bertillon, Dr. Littlejohn, Mr. Holmes, Dr. Ludwig, Dr. Seaton, Dr. Fowler, Dr. Laveran, Dr. W. J. Russell, Dr. Buchanan, Sir Philip Magnus, Mr. Hutchinson, Mr. Erichsen, Professor Notter, Dr. von Rózsahegyi, Mr. E. Hart, Mr. Shimpei Gotoh, Dr. Poore, Rear-Admiral Stephenson, C.B., Dr. Lehmann, Mr. M. Morris, Dr. Russell, Mr. Digby, Professor von Hoffmann, M. Colin, Professor Kuborn, Sir W. Mac Cormac, Sir Dyce Duckworth, Professor Overbeck de Meyer, Dr. Reid, Dr. Pavy, Dr. Bristowe, Dr. Russell Reynolds, Dr. Migerka, Professor Stokvis, Professor Celli, Professor Pistor, Dr. von Mayr, Dr. Corfield, Dr. Priestley, Dr. Chauveau, Dr. Roux, Von Esmarch, Dr. Delépine, Dr. Cornil, Dr. F. de Veyga, Dr. Godfrey, Mr. Shirley Murphy, Dr. Armstrong, Sir Henry Thompson, Dr. Roberts Thomson, Dr. Klein, Dr. Sturges, Dr. Roth, Dr. Napias, Mr. T. Wakley, jun., Dr. Theodore Williams, Dr. Tatham, Dr. Gunther, Sir Arthur Blomfield, Sir Douglas Maclagan, Professor Pacchiotti, Mr. Francis Galton, Dr. W. Ogle, Professor Corradi, Surgeon-General Cornish, C.I.E. The above names are given roughly according to the plan of the tables, the cross benches being taken from right to left.

CONVERSAZIONE AT THE COLLEGE OF SURGEONS.

The usual and sombre quietude of Lincoln's-inn-fields was early in the evening disturbed by the rattle of countless cabs and carriages driving up to the precincts where the surgeons of England have their national habitat. The vast museum, library, and other rooms were soon crowded by guests of almost every nationality. Most fortunately the simple card of membership secured admittance, so there was no heartburning among foreign members, who otherwise might have taken affront at the omission of some distinguished delegate. The rooms were elaborately decorated with the finest and most highly perfumed flowers, the band of the Royal Artillery, under the direction of Cavalière L. Zavertal, discoursed sweet music from under the jawbones of the huge whale, while young ladies in elegant dresses

besported themselves between the cases containing skeletons and anatomical specimens. The whole length of the large library overlooking the square was occupied by a buffet, whence refreshments were distributed during the whole evening, the strawberries and clotted cream being especially appreciated by the foreign delegates, who for the most part had never eaten the favoured fruit in this fashion before. There were no speeches, so that there is not much to report concerning the evening beyond the fact that the utmost cordiality prevailed throughout.

GARDEN PARTY AT HOLLY LODGE, HIGHGATE.

On Tuesday afternoon the Baroness and Mr. Burdett-Coutts gave a garden party to members of the Congress at Holly Lodge, Highgate. The weather was fortunately fine, and the company was very large. The arrangements made for the reception and entertainment of the guests were most complete, and, in addition to the bands of the Coldstream Guards and Y Division of the police, the company were enabled to hear the interesting performances of the African Native Choir, which were given on the lawn. This delightful gathering was highly appreciated by the numerous visitors, and it formed one of the most pleasant of the social events of the week.

THE RECEPTION AT THE GUILDHALL.

Some four thousand guests received regal entertainment at Guildhall on Tuesday evening. The reception was, on the whole, well managed, and everyone was much impressed by the beauty of the scene. The grand hall of the Guilds, brilliantly illuminated and decorated with flowers and palm trees, was most imposing. But every part of the building had been thrown open. In the library there was an exhibition of plate and historical relics lent by various City companies, and notably by the Barber-Surgeons' Company, commencing with the grace cup and cover presented to the company by King Henry VIII. In the art gallery there was part and glee singing; at the entrance, or crush room, the band of the Grenadier Guards; in the Guildhall, the band of the Royal Artillery; but what most impressed and charmed our foreign guests was the band of harpists in the council chamber. Mr. John Thomas's solos were encored again and again, and his band of young lady players was much applauded. On every side there were refreshment buffets, which were well patronised by the somewhat exhausted congressionists. It is doubtful if any members of the Congress failed to respond to the Lord Mayor's invitation. One and all were most anxious to be present, and, being present, were certainly not disappointed. It would be difficult to find anywhere a more brilliant spectacle than such receptions, particularly when, as on this occasion, the scene is enlivened by a great number of foreign uniforms and Court dresses. Orders and stars, well-earned medals and decorations, shone on all sides, and were tokens of the good services rendered by the members assembled for the Congress of Hygiene. The Lord Mayor could not have found guests who, by reason of the distinguished services they have rendered to the cause of humanity and of science, were better deserving of his hospitality, and the guests could not have found in any town a more cordial welcome or a more brilliant reception. The only thing that marred the entire success of the evening was the utter want of organisation with regard to the distribution of coats, hats, &c., when the visitors were leaving. Apparently no arrangements had been made to deal with so large a number of persons, and a terrible crowding was the consequence. We can bear personal testimony that many of the guests were wedged and stifled in a crowd for the best part of an hour before they could procure their hats. This incident is much to be regretted, as not being calculated to maintain the proverbial high opinion of foreigners with regard to the City of London.

On Wednesday, garden parties were given by Lord and Lady Wantage, at Carlton House-terrace, and by Sir Edwin Saunders, at Wimbledon. A similar gathering took place at the Royal Normal School for the Blind. A dinner was given by the Society of Medical Officers of Health, at the Holborn Restaurant. There was also a reception held at the National Health Society, with an exhibition of nursing and sanitary appliances.

On Thursday, a reception was held at the Parkes Museum, and a visit was made the same evening to Wormwood Scrubs Prison. The Crystal Palace was not left out of the programme, a subscription dinner, followed by an exhibition of fireworks, being provided at that favourite resort.

SOIRÉE AT THE ROYAL COLLEGE OF PHYSICIANS.

There was a very large gathering on Wednesday night in the comparatively limited space of the Royal College of Physicians at Pall-Mall East; and it was solely owing to this latter fact that the reception was confined to the gentlemen members of the Congress. The guests were received in the Censors' Room by the President, Treasurer, and the members of the Reception Committee, who wore their scarlet robes; and in a short time the Library Hall became filled with an animated throng. The walls were hung with several excellent works of art, and the string band of the Royal Artillery performed selections in the hall, which, together with the staircase, was profusely adorned with flowers and tropical plants. Refreshments were served in the lower library.

The Fellows' Club of the Royal College of Physicians entertained several of the members of the Congress at dinner on Wednesday evening at Limmer's Hotel. The chair was taken by Sir Andrew Clark, Bart., who was supported by Sir Joseph Lister, Dr. Pavy, Dr. Johnson, Sir Peter Eade, Dr. Philipson, Dr. Herman Weber, Dr. Douglas Powell, Dr. Robert Thomson, Dr. Vivian Poore, Dr. Ord, Dr. G. Harley, Dr. Langdon Down, Dr. Kingston Fowler (hon. sec. of the club), and several other Fellows. Amongst the guests were Sir Henry Roscoe, M.P.; Sir Joseph Lister, Sir John Coode, Mr. F. Galton, Mr. J. R. Diggle, Lieut.-Colonel Dr. Woodhull, Surgeon-General Cornish, C.I.E., Professor Cornil, Professor Baumler, Dr. Jacobi, Professor Ponfick, Dr. Graf, Professor Hueppe, and Dr. Roux. After the toast of "The Queen" had been duly honoured, the President proposed, in felicitous terms, "The health of our Guests," which was responded to by M. Cornil and Lieut.-Colonel Dr. Woodhull. The President having to leave in order to receive the guests at the Conversazione, the chair was taken by Dr. Pavy, and after Sir Joseph Lister had proposed "The health of the President," the company adjourned to Pall Mall.

A Ladies' Committee—consisting of the following: Lady Wantage, Lady Galton, Lady Clark, Lady Lister, Lady Dalby, Lady Duckworth, Lady Roscoe, Lady Fayrer, Lady Saunders, Mrs. Franklands, Mrs. R. C. Priestley, Mrs. Molins, Miss Hart, Mrs. Rose, Mrs. Theo. Williams, Mrs. Russell Reynolds, Mrs. Douglas Powell, Mrs. Malcolm Morris, Mrs. Brudenell Carter, Mrs. Everett Millais, Miss Spencer Wells, Mrs. Shirley Murphy, Mrs. Ernest Hart, Mrs. Arthur Lyell, Mrs. Lauder Brunton, and Mrs. Theodore Acland—was formed to make arrangements for the comfort of foreign ladies visiting the Congress. Mrs. Priestley acted as president, and Miss Lankester as secretary. The headquarters were at Agnew's Gallery, Bond-street, where a conversazione was held on Wednesday evening. Amongst others, the following foreign ladies were present:—Madame Brouardel, Madame Gebhart, Madame Richardière, Fraulein Nigg, Madame Laveran, Madame Cornil, Mrs. Lecky, and Mrs. Ewing (New York). Some 200 attended, including ladies from Finland, Norway, Sweden, and Denmark.

SECTIONAL MEETINGS.

The following is a summary of the more important papers and discussions which have been brought forward at the various Sections:—

SECTION I.

PREVENTIVE MEDICINE.

This Section was presided over by Sir Joseph Fayrer, and was well attended throughout the day.

Sir JOSEPH FAYRER delivered his opening address, which will be found in another part of our impression.

Quarantine.—"The Mode of Preventing the Spread of Epidemic Disease from one Country to another" was the first subject on the agenda. Three papers were read upon it, and a prolonged discussion ensued.—Surgeon-General J. M. CUNNINGHAM read the first paper, in which he indicated his view that the first method of preventing the spread of epidemic disease from one country to another was that of quarantine, which was of two kinds, land and sea. Land quarantine, although occasionally resorted to, had been found impracticable. Sea quarantine had done no good. There were no cases where an exemption from

cholera had been proved as due to quarantine. Quarantine was a tyranny, obstructing commerce and interfering with personal liberty. The second method was medical inspection of every ship arriving in port, and action taken on the presence of illness. If infectious illness were present, isolation and disinfection were to be resorted to. This method was a great benefit to the sick, but could not be credited with preventing epidemics. The only method for preventing the spread of epidemic disease from one country to another was sanitary improvement, better drainage, water-supply, and food-supply for the people.

Dr. ROBERT LAWSON, Inspector-General of Hospitals, whose paper was entitled "The Communicability of Cholera from Country to Country," observed that to draw up a plan to prevent the extension of a disease, say cholera, from one country to another, with any prospect of success, it was necessary to have a general acquaintance at least with the different factors which contribute to the result, and of their mode of operation. The existing information on these points fell far short of these requirements, and its increase had been enormously impeded by the belief that man himself was the chief agent in diffusing the disease, and by interpreting the evidence obtained from various sources with an undue bias in favour of the theory. There had been, in short, and still remained, a most serious error in assuming that personal communication was the principal factor; and a no less extensive error in the methods and reasoning by which the central idea of diffusion by man was advocated. There was necessity for a complete change in all these respects; the character and causes of cholera must be derived from a critical examination of all the evidence nature presented, and from a study of the methods she herself adopted, instead of from our *a priori* deductions. Cholera occurred in two different forms: simple cholera or cholera nostras, of little severity, and attributed to local causes; and Asiatic, epidemic, or malignant cholera, always a serious disease, and by many attributed to a poison given off by those labouring under it to others, and so diffused until it became epidemic. Since 1832, when cholera visited Europe in the epidemic form, cholera nostras had been observed to fluctuate every few years, and with the milder cases occurred a certain number presenting all the characters of the malignant disease; these cases occurred singly or in small groups, but in every instance they accompanied epidemics of varying severity, at no very great distance off, and were under the same "epidemic influence." Those who supported the theory that man diffused cholera were necessarily required to show that persons under the disease must arrive at points where it had not yet appeared before it commenced in these latter, and that the first attacks in the new locality had been in persons exposed to the imported cases; but there were now a good many instances of epidemics springing up in localities at a distance from where the disease was already prevailing, and without any trace of importation, and where those first attacked had resided in the country for many months in succession without communication with any previous case. Such were the outbreaks at Southampton in 1865, at New Orleans in 1873, and at Toulon and the south of France in 1884, all of which were most carefully investigated on the spot. The only other conclusion open was that the necessary factors were supplied by epidemic influence; and if supplied in one instance, supplied in all; where there appeared to have been importation at the commencement of the outbreak, it must not be assumed that the disease was communicated by man unless the epidemic influence could be excluded, as at present it could not. It seemed probable that the exciting factors were conveyed by the air, whether fully or only partially developed, and consequently it was not in our power to exclude them; but much might be done by hygienic and other local means to limit their development in the localities they reached, and so to avoid excessive mortality.

Dr. J. ASHBURTON THOMPSON (New South Wales)—who considered principally the question of "Quarantine in Australasia: Theory and Practice"—said the amount of traffic which had to be dealt with was an important consideration in all questions of practical quarantine. The Australasian Sanitary Conference of Sydney, N.S.W., 1884, was attended by delegates of each of the six Governments, and by the speaker. Their resolutions were unanimous, accepted by each Government, and presented to each Parliament. They had not been modified since 1884, and were therefore those received in Australasia at the present day. Limited quarantine, medical inspection, the outcome of England's local conditions, was exactly suited to them, but not necessarily suitable, therefore, where local conditions differed from England's. The first proposition of the conference was the degree of protection which quarantine measures can afford. This varies inversely with the ease of communication between the infected country and the country to be defended. The difference between English and Australasian conditions was described. The conference rejected ancient quarantine as a principle of action, and on account of easy and daily interchange of population between the six territories decided to regard Australasia as constituting one epidemiological tract, and consequently to relinquish all quarantine as against each other. Then, before adopting resolutions which would affect others, they put themselves in order by declaring in a second proposition that quarantine can yield protection commensurate with its costs only to countries whose internal sanitation is good; and they recognised defects inherent in all quarantine measures by declaring, in a third proposition, that the function of quarantine is not to exclude infection, but to lessen the entering number of foci of infection, and thus made it clear that exclusive reliance was not placed by them on quarantine as a defence against imported disease. Having thus indicated what should be refrained from, it proceeded to say what should be done. Nations whose internal sanitary organisation was not perfect cannot afford to refer the observation of suspects to the country at large. It was decided consequently that limited quarantine should be employed against ships actually carrying cases of exotic disease—that was, that vessels and equipment should be cleansed forthwith and held for delivery to owners at earliest possible date, but that the ship's company should be detained in isolation for periods slightly in excess of recognised clinical incubation periods. Medical inspection was thus rejected as a principle of action not less than ancient quarantine, but still not inconsiderately; when imported disease was one already familiar ashore, the circumstances were seen to resemble England's, and then medical inspection must (not might or could) be used. Accordingly, in case of scarlatina or the like, patients were removed to ordinary isolation hospital (not quarantine), the quarters cleansed, and the ship discharged in the usual way after five or six hours' detention. These principles were strictly adhered to by the Government of New South Wales since 1884. If not quite so closely by the other five Governments, the reason was probably political rather than commercial or scientific.

Dr. ROCHARD (Paris) was unable to be present, and a communication from him was read to the Section. In it he said the means of preventing the transmission of epidemic disease were threefold, namely, isolation, disinfection, and sanitation. The first was the simplest and the most radical. It was also the most difficult to use, because it required the intervention of public enactments, and the existence of an *entente internationale*. It was the system of quarantine and of the sanitary cordons. The second was more modern and was the result of the development of contemporary science. The third rested on the progress of urban hygiene. It was probable that when we had sanitary towns we could brave epidemics. England had spent five millions since the commencement of the century, and it did not fear cholera during the last epidemic. Some of England's resistance to the cholera must be ascribed to its great distance from the source of cholera. M. Rochard next proceeded to detail the means taken by the French authorities during the last cholera epidemic, and expressed the belief that it was necessary to persevere in the employment of those measures which responded to the necessities of the moment and to our present knowledge.

In the discussion which followed, Dr. FELKIN gave some instances of outbreaks of epidemic disease in Africa and the means taken for dealing with them, and said he thought they should recognise that uncivilised people understood to a certain extent the prevention of disease, and we should try in some ways to follow their steps more closely than we did at present.—Dr. HEWITT (Minnesota, U.S.A.) said they had very little to do in his State with disease properly called epidemic except that of small-pox. Cholera had but once obtained something of a lodgment, and then it came directly from the port of New York. Small-pox came to them directly through emigration from the ports of England, and most of it came through the Gulf of St. Lawrence. Only the other day cases came from Liverpool to Minnesota. The "devil in the box" with them was the infection. He mentioned

one case in which infection was carried in the clothing of a woman who did not have the disease herself, but had been exposed on shipboard to it. The epidemic resulted in 300 deaths. For interior States like Minnesota the demand was that there should be complete sanitary central organisation, with local organisation in direct relation thereto, and that this organisation should stand in direct relation to the quarantine service, which should be bound to give notice to the interior authorities of the presence of disease or infection, and that they should all coöperate for its control.—Dr. SIMPSON (Calcutta) said this question should be looked at in regard to India from a totally different point of view. The population of India who suffered from cholera were the Hindus and Mahomedans, and they were not the persons who come to Europe. The people who did come to Europe and had to do with the trade between Europe and India were Europeans who did not suffer from cholera. The real source of cholera epidemics, in his opinion, was from emigrants and pilgrims coming overland and in ships to Mecca, where there was a focus 2000 miles nearer Europe than any Indian port, and 4000 miles nearer than Calcutta. It was from that point that sanitation should commence. That sanitation did have effect he thought they had no better example than Calcutta itself.—Dr. THORNE THORNE agreed with Professor Rochard that if they could get the towns into a proper sanitary state quarantine would be unnecessary. The only question between them was as to whether they were to put the cart before the horse in this matter. He maintained that so long as they told people that they would draw lines around them, call them what they liked, so long would the people be indifferent to sanitation, and would not spend money on it. In this country, in consequence of the system adopted here, quite apart from the question of cholera, they had saved several hundreds of lives which would have been lost if they had had any quarantine whatever. The real point was whether to begin by quarantine or by improvement of the sanitary conditions of the towns. He believed one day, when the Mediterranean ports had improved their sanitary condition, they would be agreed that they did not want quarantine.—Brigade-Surgeon M'GANN said his experience had been that quarantine was useless. Medical inspection was desirable, no doubt, but not of any particular advantage. The great thing was sanitation. Improved sanitation throughout the country was the most efficient means of dealing with cholera, and water must have the first consideration.—M. BROUARDEL pointed out that restrictions were imposed on ships at British ports in the Mediterranean.—Professor STOKVIS (Amsterdam) said that at the Intercolonial Conference at Amsterdam in 1883 he had no opinion on this question, but now he had. Since the time the Dutch in India had followed the example of England, cholera and dysentery had been diminishing in a most remarkable manner. While the percentage of mortality amongst the Dutch soldiers in India from 1874 to 1878 was 15·0, there had, in consequence of the introduction in the interval of artesian wells and a better supply of water, been a decrease in the period from 1879 to 1883 to the rate of 6·4, and from 1884 to 1890 it was 3·0. They had to thank England for the example she set them, and he concurred with the previous speaker that, so long as people were allowed to believe it was not necessary, they would not undertake sanitary improvement.—The PRESIDENT, replying to M. Brouardel, repudiated the assertion that our legislation was responsible for what took place at Gibraltar and Malta. He asked if anybody really supposed that any English surgeon would sanction the absurdities that existed at Gibraltar and Malta. They repudiated them altogether. He repudiated quarantine because he thought it could have no possible effect in practice. It was diverting them from the legitimate object of their work. Where they gave people proper food and enabled them to live under proper conditions, disease would diminish. It was not the object of this Congress to discuss abstruse subjects as to germs or the origin of cholera. He did not pretend to know what was the cause of cholera or other contagious diseases, but he did know what would mitigate such diseases and prevent the growth of the death-rate and improve the condition of the human race.—Surgeon-Major R. PRINGLE said that to him, as one who had seen as much cholera in India as most medical officers of thirty years' service in that country, one thing was clearly established—namely, that any attempt at quarantine in India only led to misconception of the whole case, and tended to increase insanitation. It showed also that it was a question of £ *s. d.*, for he never saw a quarantine that a rupee could not get through. What they wanted was pure air, pure water, and good food, and do not let them think that quarantine could be anything else than a cloak for insanitation.

After an hour's interval for luncheon the discussion was resumed by Surgeon-General H. Cook, Dr. Robert Grieve (British Guiana), Brigade Surgeon Staples (Gibraltar), Deputy Surgeon-General Cayley (Netley), and several other officers of Indian experience, by whom a general concurrence was expressed with the views of Surgeon-General Cuningham, the President, and others.

Entozoa in Human Blood.—Dr. PATRICK MANSON (London) read a paper on the Geographical Distribution, Pathological Relations and Life History of Filaria Sanguinis Hominus diurna, and Filaria Sanguinis Hominis Perstans in connexion with Preventive Medicine. This important paper dealt from the point of view of preventive medicine with the better known of the human entozoa. The author commenced by drawing attention to certain points of contrast between the entozoa and the micro-organisms bearing on the preventive measures they respectively demand. The entozoa, in consequence of their comparatively large size and exposed life history, were easily excluded from entering the human body. In the case of the micro-organisms it was otherwise, for these were so minute, and so diffusible in air, water, and other media, that it was practically impossible to protect ourselves from them in the same way as from the entozoa, and we had to content ourselves with endeavouring, by vaccinations and other means, to diminish individual predisposition, or with keeping away from centres of infection. He presented a synopsis of fifteen entozoa, all of them exotic to Europe. Many of these were highly dangerous. He showed that eight of them were indigenous to Asia, eight indigenous to Africa, one of them (bilharzia) being exclusively confined to that continent and its dependencies; one only (filaria nocturna) was found in Australia; one was peculiar to Greenland (bothriocephalus cordatus); and two of them (filaria nocturna and filaria loa) were found in South America, where they were probably imported with the negro. He drew up certain well-considered rules for the prevention and diffusion of the entozoa. These rules he divided into those applicable by the individual and those which ought to be enforced by the State. He showed that the former were in themselves sufficient to prevent the spread of the entozoa; they could, however, be powerfully aided by State measures. He concluded by saying that his principal object in this paper had been to suggest means for the prevention of entozoal disease in those countries where they were relatively most frequent, and the diseases they produced more formidable. These countries, for the most part, were tropical countries, where the ravages produced by the different species of filaria sanguinis and by bilharzia amount in the aggregate to something enormous, and which only those who had had personal experience and had given special attention to this subject could appreciate. These parasites were indeed scourges to mankind; though their action was slow it was none the less certain, and they led in very many instances to the grave deterioration of the general health of those they attacked, and in many cases to disease of a painful, loathsome, and frequently fatal character. When it was considered that a large proportion of the inhabitants of hot countries harboured these formidable entozoa, the importance of well-considered means for their prevention, and of the admirable rules Dr. Sonsino had laid down for the guidance of the hygienist in his endeavours to combat these scourges, was apparent.

Specimens illustrating the address were shown under the microscope. This concluded the business for the day.

WEDNESDAY.

Diphtheria.—This was the subject first considered by the Section on Wednesday, and a number of papers were read upon it. The first was one by DR. EDWARD C. SEATON (London), which was entitled "Diphtheria, with Special Reference to its Distribution, and to the Need for Comprehensive and Systematic Inquiry into the Causes of its Prevalence in certain Countries and parts of Countries, with a view to its Prevention." In the course of his paper Dr. Seaton observed that no climate appeared to give immunity

from the prevalence of this disease, but the tropics suffered less than cold and temperate climates. During the present century, in Europe, France had been the principal centre for diphtheria; but from accounts given by Dr. Hewitt, the health officer for the State of Minnesota, U.S., certain tracts of country in that great State were even more remarkable centres of diphtheria. In England, Longstaff had studied the distribution of the disease. He had taken his facts from the abundant statistics of the twenty-six years ending 1880, and had graphically displayed in a shaded map the local mortality. This was shown to be light in Devonshire, Cornwall, and the Midlands, and heavy in Norfolk and Wales. The disease did not obey the law which determined the prevalence of others of the zymotic group. Unlike them, it prevailed more in the country than in towns. But there had been observed of late years an increasing incidence of diphtheria upon the more dense populations as compared with the less dense. Another remarkable feature in the prevalence of diphtheria was that its mortality had risen in England synchronously with the adoption of extensive works of water-supply and sewerage during the last fifteen years. The reduction of enteric fever was by common consent ascribed to these improvements. It might be that the mortality from diphtheria would have been greater but for these improvements, but of this there was no proof. The author reasserted his belief that (contrary to the doctrine almost universally taught) there were but slender grounds for supposing that diphtheria was influenced favourably or unfavourably by what were generally termed sanitary conditions. He gave instances from his own experience in support of this assertion. The same point had been referred to by physicians who had had special opportunities of observation, and latterly it had been dwelt on by Dr. Thorne Thorne, F.R.S., in his admirable lectures at the Royal College of Physicians. Dr. Seaton urged the importance of these main considerations—namely: (1) The prevalence of the disease in strikingly different degree in countries in the same latitude and with similar climatic conditions, and also in parts of countries close to each other; (2) the fact that it has not apparently been influenced favourably by the adoption of sanitary measures which have been generally found effective in reducing the death-rate proves the urgent necessity for a comprehensive inquiry by our Government, acting in this respect with the Governments of other countries, into the causes which determine the prevalence of diphtheria. Such an inquiry should take into account what had already been ascertained with regard to the occasional causation and spread of the disease by milk, and the influence which schools had on its production and spread, and also the subsidiary influence of dampness, dirt, overcrowding, &c.; but its main object would be to ascertain the local conditions and circumstances which account for the disease being endemic, and becoming epidemic. To ascertain these, the inquiries must, of course, be made in countries marked by freedom from the disease as well as in those which suffered from it.

Dr. E. SCHREVENS of Tournai read a paper in which he stated that the result of observations in Belgium was that where typhoid fever committed the greatest ravages the same fact was observable in the case of diphtheria; and that where diphtheria secured its smallest number of victims, the number of deaths caused by typhoid fever diminished equally. This agreement rested on the fact that these two diseases must be considered as fæcal diseases, and their bacilli developed, prospered, and extended wherever filth and rubbish of all kinds were stored up or spread out. There existed, however, the slight difference between the conditions which were favourable to them: impurities on the surface of the soil suited the bacilli of Löffler in a special degree, while impurities of the subsoil pleased the bacilli of Eberth better. A further proof that it was in a special degree impurities of the surface which served to harbour diphtheritic germs in certain localities was the exaggeration of mortality from diphtheria in country districts compared to what obtains in towns. Density of population was not of the least influence on the increase of the mortality due to diphtheria; but the surface of the soil was much better protected in towns against impurities of all kinds. Another circumstance which might foster diphtheria in a locality was the breeding of certain species of animals presenting a great receptivity for diphtherogenic germs—for example, Italian fowls and gamecocks. The transmission of diphtheria to man by these animals was so well established by the observations collected by the author for several years past that he felt persuaded of the need of further attention being paid to this subject. A third condition which necessarily fostered diphtheria in a locality was the negligence exercised in the application of measures of disinfection and isolation. Every case of diphtheria must be notified to the local authority, who would see to it immediately, that all the children of the sick person's family were kept away from school as long as any danger of contagion exists. In every case disinfection must be rigorously attended to and performed by special agents. Notification and disinfection ought to be obligatory. The altitude of the locality did not probably exercise any very great influence.

Dr. CHARLES N. HEWITT (secretary and executive officer of the State Board of Health of Minnesota, U.S.A.) next contributed a paper on Diphtheria in that State. He stated that he had eighteen years of official and personal study of the disease in one of the North-west States of the Union. Since 1883 notification of infectious diseases had been obligatory upon physicians, householders, hotel and innkeepers, with penalty, as had been isolation and disinfection by local boards of health. The latter numbered 1575, and, with the State Board of Health, constituted the Public Health Service of the State. The following were believed to be facts in Minnesota:—1. That diphtheria is one of the most infectious and obstinate of its class of diseases; that it is communicable by persons and things, most often by the latter. 2. That its infection lives and grows outside the body and below its temperature; that it adheres obstinately to clothing, bedding, and the interior of buildings; that it is preserved easily and for a long time in clothing and the like stowed in trunks and closets. 3. That isolation and disinfection in association have served a very useful purpose in the control of the disease, the best we now have, and that with their increasing completeness the disease distribution is assuming a family character limited to one or two or three associated families, except where an infected person or infected clothing has escaped control. 4. That what is now needed is careful study of each outbreak in all its relations for more knowledge, not neglecting the sanitary measures found most efficient, as indicated, till better are found.

Dr. G. W. ABBOTT, secretary of the State Board of Health of Massachusetts, read a paper in relation to Diphtheria in that State.

Dr. MATTHEW A. ADAMS (Maidstone) read a paper on the Relationship between the Occurrence of Diphtheria and the Movement of Subsoil Water. By daily observation of the height of the subsoil water, extending over a period of six years and a half, and other concurrent meteorological events, as well as by those respecting the occurrence of diphtheria within the Maidstone Urban Sanitary District, he had collected a large number of facts which pointed to the conclusion that there was an intimate relationship between the circumstances relating to the height of the subsoil water and the prevalence of diphtheria. The conclusions he arrived at were that the organism of diphtheria inhabited organically polluted surface soil, and that, subject to suitable conditions of environment, especially as respects moisture, temperature, and food, it throve and multiplied in the soil, the micro-organism thus produced being liable to displacement from the interstices of the polluted surface soil, and to dispersal into the superincumbent air, in this manner determining outbreaks of the disease. So that, given the existence of the pathogenic organism, two sets of factors at least were engaged in the production of a state of affairs that culminated in an outbreak of diphtheria: first, those that promoted and supported the growth of the germ in the soil—such, for instance, as moisture, temperature, air, food, and so on; secondly, agents of dispersal, by which the germs already existing in the soil were driven out and distributed into the atmosphere, and so come to be breathed by man and animals; for example, sudden rainfall, rise of subsoil water, lowering of barometric pressure, &c.

Dr. GIBERT contributed a paper on Diphtheria in Havre. Diphtheria, he stated, appeared in Havre about 1860, and was limited to the Graville quarter. In 1864 there was an epidemic of diphtheria close to Ingouville. From this date the number of deaths constantly increased, and the disease, which at first was confined to only a few localities, spread

throughout the town. The severity of the disease increased until 1885, when a *brigade de salubrité* was formed as an annexe to the Bureau d'Hygiène. The dwellings occupied by diphtheritic patients having been regularly disinfected, the mortality curve had since decreased to such an extent as to justify the hope of its total extinction, provided all the medical men of the town furnished accurate information to the Bureau d'Hygiène.

Mr. CHARLES E. PAGET, medical officer of health for the county borough of Salford, in a paper on a Local Examination of the Difference in Susceptibility to Diphtheria between Old and New Residents, concluded that as the people of a district were more subjected to the continuous influence of their insanitary surroundings they were found less fitted to resist the diphtheria infection. The results arrived at appeared to be that the relative incidence of diphtheria during an epidemic period, in respect of length of residence, was dependent to no small extent on general sanitary circumstances.

In the discussion which followed, Professor D'ESPINE (Geneva), Dr. J. W. TRIPE (London), Dr. GUNTHER (Dresden), Dr. THURSFIELD, Dr. ESCHERRICH (Gratz), and Dr. JULES FELIX (Brussels) spoke. The tendency of the discussion was that the best measure for the prevention of the spread of diphtheria was that of local disinfection. This point was emphasised by Professor D'Espine and Dr. Escherrich. Most of the speakers did not consider that the drainage had much connexion with outbreaks of diphtheria, and Dr. Tripe stated that in large schools diphtheria was more often carried by contact in the playground than in the schoolroom.—On the motion of Dr. SEATON, seconded by Dr. TRIPE, it was resolved "That this Section urges the European Governments to make a comprehensive and systematic inquiry into the causes of diphtheria."

THURSDAY.

Alcoholism and Public Health.—On Thursday this was the principal subject dealt with by the Section during the day. Sir DYCE DUCKWORTH read a paper on the relation of alcoholism to public health and the methods to be adopted for its prevention. He first discussed the question of the legitimate use of alcoholic drinks by persons in health, and the views of the medical profession as a body on this subject. He pointed out that the teachings of the physiologist on a matter of this kind could be of no particular value to physicians, because the former had nothing to do with humanity and the habits of a complicated social system. Strict temperance was shown to be beneficial, and was the end to be sought by all who were desirous to settle the alcohol question. Drinking of alcoholics between meals was strongly condemned, and the two essential points to secure were that little be taken, only with meals, presumably after a day's work was done, and that the liquor, whatever it was, should be good. Much harm came from the consumption of bad liquors, and undue blame fell on alcohol from this cause. The misuse of alcohol was next considered. For the careless drunkard sterner punitive measures than commonly meted out were recommended, including cumulative fines, deprivation of the electoral franchise, and corporal punishment. It was shown that the insane drunkard or habitual inebriate was often descended, but not always, from an ancestry that had abused alcohol, that he was as irresponsible as an epileptic or a maniac, and required medical care, compulsory detention, and the same *régime* as a lunatic. Such cases were practically hopeless. In conclusion, Sir Dyce Duckworth expressed the view that progress would steadily be made, though slowly, and he did not trust too much to secular education or sanitary progress alone, but, above all, to the spread of the knowledge of God's law, and to the implanting of His fear in the human heart.—On the same subject Professor WESTERGAARD (Copenhagen) read a paper, which will be found in another column.—Mr. J. G. PHILLIPS also read a paper.—A discussion followed, in which Dr. Norman Kerr, Sir Joseph Fayrer (President of the Section), Dr. Hewitt of Minnesota, Professor Alglave of Paris, Dr. Kinkead of Galway, Dr. Isambard Owen, Sir V. K. Barrington, Dr. Robinson of Maine, U.S.A., Professor Sonsino of Pisa, and Professor Böhmert of Dresden took part.

The following papers were read in the afternoon:—The Improved Hygienic Condition of Maternity Hospitals, by Dr. Priestley, London; La Prévention de la Cécité Professionnelle, by Dr. Van Dooremaal, of the Hague; the Prevention of the Spread of the Epidemic of Influenza, by Dr. Sisley of London; the Influence of the Nile on Mortality in Egypt, by Green Pasha of Cairo; Observations on Malaria and Enteric Fever in Central Africa, and on the Possible Antagonism between Malaria and Phthisis, by Dr. Felkin (Edinburgh); and Measures for preventing the Spread of Infectious Diseases, by Dr. Lewis W. Sambon (Naples). In the latter paper the author pointed to the transmission of infectious diseases through the atmosphere, and argued in favour of improved sanitation rather than quarantine. He also spoke of the great improvements which had been made of late years in Naples, and dwelt upon Professor Spatizzi's connexion with these improvements. The Section then adjourned.

SECTION II.

BACTERIOLOGY.

The President (Sir JOSEPH LISTER) delivered the introductory address in this Section. He said: "Gentlemen,—The International Medical Congress, which was held in London in 1881, was graced by the presence of the two foremost bacteriologists—Pasteur, the father of the science, to the splendour of whose work from first to last I could not trust myself to attempt to do justice, and Koch, who has rendered such signal service to the science. Would that the health of one of these men and the engagements of the other had permitted them to be present with us to-day. During the ten years that have since elapsed great work has been accomplished. On the occasion of that Congress Pasteur formulated his position with respect to the attenuation of virus and preventive vaccination. Koch demonstrated the use of his method of cultivation on solid media, while we had also an opportunity of seeing here in London, for the first time, the tubercle bacilli which he had discovered. Since then Pasteur has done all his wonderful work regarding rabies, and Koch has extracted from the bacillus which he had discovered a substance which he has employed for diagnostic and therapeutic purposes in tubercular disease. And whatever may be the ultimate judgment arrived at regarding the therapeutics of tuberculin, there can be but one opinion as to the transcendent interest, pathologically, of its effects. Other men meanwhile have been assiduously cultivating the wide field of bacteriology, and have arrived at results not unworthy of the masters whom they have followed. Without attempting even to notice all the work that has been done, I may refer to the separation of the virulent chemical poisons secreted by some bacteria from the organisms that produced them, as was done by Roux with diphtheria; the elaboration of the phagocyte theory by Metschnikoff; the conferring of immunity against tetanus by Behring and Kitasato, by injecting an inorganic chemical substance into the circulation, and the proof that the serum of an animal on which immunity had been conferred in this way would itself produce immunity in another animal; the observation of Hankin that a little of the serum of the blood of a rat introduced into the circulation of a mouse will confer immunity in that animal against anthrax; and the beautiful proof given by MM. Vaillard and Yersin, that the bacillus of tetanus, when separated from the poison that it produced, is incapable of developing among healthy tissues. These, gentlemen, are but samples of the work that has been accomplished during the last ten years. Those who wish to be convinced of its enormous value and extent have only to visit our museum, which consists of two parts. One department is devoted to the exhibition of apparatus employed in bacteriological research; the other contains the most beautiful series—or set of series rather—of preparations of all the micro-organisms that have been discovered. In the name of the Council I beg to thank those gentlemen who had brought together, at very great trouble to themselves, a collection so beautiful and instructive."

Hæmatozoon of Malaria.—The President then called upon Professor A. LAVERAN, who read a paper on the Hæmatozoon of Malaria. He said that the hæmatozoon, first described in 1880, had since that date been recognised by many other observers. Its morphology was now well known. The chief forms which it assumed were indicated in a diagram shown (Fig. 1). A description was given of: (1) The spherical bodies, (2) the flagella, (3) the cruciform bodies, (4) the rosette-like bodies. The flagella could only be demonstrated in fresh blood; the other forms, however, were well seen in preserved blood (microscopic slides shown).

The blood in paludism was easily studied by rapid drying and fixation of the specimen by heat, followed by staining with a concentrated solution of methyl blue or gentian violet. A double staining could be effected by successively immersing the specimen of dried blood in concentrated aqueous solutions of eosin and of methyl-blue, whereby the red cells assume a rosy hue, and the leucocytes, together with the parasitic bodies, are coloured blue. Nuclei had been observed in both the spherical and the cruciform bodies. Two, and even three, different varieties of this hæmatozoon had been described (polymorphism). Similar hæmatozoa had been found in different animals—frogs, lizards, marsh tortoises, birds. In many species of birds there was to be found a hæmatozoon so similar to that of paludism that most observers regarded the two forms as identical. The similarity was very marked, yet several points of difference existed; thus, in the blood of birds the cruciform bodies were not found; the parasitic element were endoglobular, and never became free, as was often the case with the true paludic hæmatozoon; and the amœboid movements of the spherical bodies were much less notable in the case of the organism found in birds' blood. On the other hand, this latter hæmatozoon had been observed in birds living in non-marshy regions, and it frequently caused no inconvenience to its host, and the inoculation of blood containing this hæmatozoon had given only negative results. Yet the study of this organism might be expected to throw light upon many obscure points in the life-history of the true hæmatozoon of paludism, with which it presented many points of similarity.

Professor CELLI (Rome) supported the view that malaria was of parasitic origin.—After a few remarks by Professor Cunningham, Professor CROOKSHANK congratulated M. Laveran upon his brilliant paper and demonstration. It was a striking example of the value of international congresses when investigators from different countries could meet together to hear an account of such a discovery from the lips of the discoverer. Five years ago Professor Crookshank studied the organisms in malaria in the laboratories in Rome and Pavia, and the question was whether they were pathological products of the red blood-corpuscles or blood parasites. The evidence pointed to their being animal parasites, and Professor Crookshank thought that they ought to be studied in the light of our knowledge of the hæmatozoa of fish, birds, equines, and rats. There was evidence also in favour of the organisms being regarded as the cause of malaria, but this relation was not yet proved, and allied organisms were found in healthy as well as in diseased animals. The presence of these organisms in man was, however, evidence of the existence of malaria, and their detection was therefore invaluable as a diagnostic sign.—Dr. NORTH was of opinion that there could be no doubt that in the blood of those suffering from acute malarial affections important changes were to be observed, but he could not accept as proved that the origin of malarial fevers was a pathogenic organism. The only proof that organisms caused malaria was derived from experiments and inoculation, which, he maintained, were absolutely valueless when performed in the country in which the malaria existed. He was strongly of opinion that the phenomena could be explained by the action upon the thermotoxic nervous system and by those violent changes from heat and cold which notoriously occur in all malarious countries.—Dr. HUEPPE could not agree with Dr. North, and stated that the plasmodium found in the blood caused the malarial fever.—Dr. ANDERSON (India) said that in certain parts of India and other malarial countries at certain periods of the year one was almost certain to be infected. This was a case in which there could be no symptom of chill. He supported the belief that malaria was due to some organism being received into the blood, and thought no other possible explanation could be offered. Dr. COOPER (Bombay) assured the Section that he knew districts in which it was almost impossible to escape from the disease, and was distinctly of opinion that it was due to bacilli. The fact that it had not been isolated was no proof that it did not exist.—Dr. LAVERAN, in reply, controverted the position of Dr. North. Very little was known of the life of these protozoa, but he thought we might very well believe that malaria was due to a parasite.—Dr. CELLI (Rome) pointed out the differences between Dr. Laveran's views and those of his colleagues in Italy.—The PRESIDENT (Sir Joseph Lister) congratulated the Section on the great value of the facts laid before them during the discussion. Dr. Celli had stated that he had difficulty in believing that an organism could be the cause of malaria, because it had not been discovered in the soil &c. But if he deemed it to be an organism at all, then, as he could not suppose it to come from spontaneous generation, it must come from some source external.

Asiatic Cholera.—Dr. HUEPPE (Prague) introduced a discussion on the Bacteriology of Asiatic Cholera. He described the history of the researches which had led to the discovery of the cholera bacillus, and the mode by which from being an anaerobic organism it became transformed into an aerobic one. He said that because Pasteur's physiological method did not give the cultivations he required, he proceeded to try a modification of that method, which led him to discover that it was better not to go from the anaerobic to the aerobic directly, but that the changes should be accomplished gradually. He made cultures of the bacilli in egg albumen in a manner not previously adopted. So virulent did the bacilli become by this means that an injection of the culture into a guinea-pig produced toxic results in a few hours, and in a few days toxines were developed in sufficient quantities to kill the animal, while formerly forty days frequently elapsed before the death of the creature, if it even died at all. The active agent was globulin, which developed only in albumen, and in no other substance. This toxine caused nephritis in most cases, but experiments in connexion with cholera nostras had failed to cause inflammation of the kidney in animals. Dr. Hueppe believed the toxine of cholera to be a peptone. The aerobic bacilli of cholera were very resistent to hydrochloric acid, and thus adapted to pass through the stomach into the intestine. By his method toxine-producing cultures might be obtained in two or three days. — Dr. KLEIN (London) followed, and asked if there was sufficient evidence for considering the comma bacillus to be the bacillus of cholera. Facts which had come before him indicated that the question was by no means so simple or so thoroughly established as one would imagine from statements which had been made on the subject. Was it a fact that in every typical cholera case this comma bacillus of Koch could be found to give a feasible explanation on this theory? From his examination of cholera in India he had come to the conclusion that there was no such uniformity in the distribution of the comma bacillus as was formerly supposed. He would like to hear Professor Hueppe's experience on that point. In how many cases had he seen this comma bacillus? Dr. Cunningham had informed him that in May and June they had had the opportunity of examining ten typical cases of cholera in which he failed to demonstrate the presence of this comma bacillus at all. There are other cases in which they are present almost as pure cultures. As regards the bacilli which had been cultivated from cholera material, differences of morphology and characteristics pointed to the fact that they did not belong to the same species. He did not claim the credit of conducting these investigations, but Dr. Cunningham had shown that when the same kind of media was used and exactly the same external conditions maintained, these species were shown to differ in the rapidity of growth, in the liquefaction of the gelatine, and in the method of liquefying. These remarkable differences were maintained on different media, and thus they could not possibly be assumed to be the same species. Most distinct differences existed in the size of the bacilli. This was illustrated by slides prepared by Mr. A. Pringle, which showed the various species of comma bacilli. Dr. Cunningham had shown that there were well-established morphological differences in their size and in the method of cultivation. He admitted the presence of the comma bacillus in mucoid material such as occurred in cholera, but maintained that this was not limited to cholera cases, and a great many species might be present in mucoid material under other conditions. The lantern showed species taken from an ape which had died with symptoms of severe diarrhœa; in the mucous flakes large numbers of comma bacilli were present. Another ape had died under similar conditions, and he defied anyone to produce a preparation of a comma bacillus where a cultivation of that organism could be obtained purer than in this case, which had not suffered from cholera at all. He did not maintain that this was the same species that occurred in cholera, but he had not succeeded in cultivating it. He believed that certain conditions of the intestine may favour the production of a large abundance of a certain species of organism, which need not have any causal connexion with cholera.—Professor MAX GRÜBER (Vienna), in the discussion said that those forms introduced by Dr. Cunningham and demonstrated by Dr. Klein were new forms

which had sprung out of one culture under different conditions. The forms which had been exhibited might be produced from a bouillon culture in from four or five to eight hours. Spiral filaments might also be found in the culture. There were cultures which were known to liquefy very slowly which can be transformed into cultures which liquefy rapidly on being frequently inoculated on media of a high order. He had tried the method mentioned by Professor Hueppe, but he had not found that his animals died so soon under the influence of the cultivations. They had lived for more than twenty-four hours, and the original specimens were shown in the museum of the Bacteriological Section. The differences between his results and Dr. Hueppe's may be accounted for by the fact that his cultures are four years old, and had been in his (Dr. Hueppe's) laboratory for that period.—Dr. BRUCE (Netley) thought it was a curious thing that so many of the statements made in speaking and writing on this subject were afterwards found not to be true. For example, Professor Gamaleia had brought forward certain alleged proofs that he could produce immunity against cholera by a process which depended in the first place on the exaltation of the virus of Koch's comma bacillus by being injected into the blood of pigeons or into the pleural cavity of white rats. Professor Pfeiffer had shown that the first of these statements was totally untrue. He had tried the second method, and had satisfied himself that the rats did not die. Professor Hueppe had spoken of these organisms being spore-bearing, but that he could not agree with. Dr. Scholl had stated that the cholera bacillus, grown in the interior of hens' eggs for nineteen days, were found to be intensely virulent, but he had kept them alive in the same media for nine months, and when injected into guinea-pigs the inoculation had produced no result at all; whereas Dr. Scholl claimed that his guinea-pigs died in about forty minutes. If, on the other hand, Koch's way be followed, some good results would usually be arrived at. His observations were so clear, so thorough, so careful, that even a child could follow him. Dr. Bruce thought that the differences of species might be accounted for by Dr. Hueppe using a less alkaline gelatine than Dr. Klein; but that was only his theory.—Dr. HUEPPE, replying on the whole discussion, said he had been acquainted with the objections of Dr. Klein since 1884. His opinion was that we had nothing to do with species when slight differences in the cultivation of the bacillus were observed.—Dr. KLEIN, replying, said that Dr. Max Grüber had misunderstood him. He meant that certain differences were to be found as regards the morphology in different mucus flakes, and that under cultivation the differences would be maintained, just as in the case of Koch's comma bacillus and Friedländer's. On that point neither Dr. Hueppe nor Professor Max Grüber had understood him properly. Dr. Bruce's explanation of the differences of the results were not to be accepted.—The PRESIDENT (Sir Joseph Lister) thought members would be able to form their own conclusions as to what direction the balance of evidence told. What struck him as being particularly interesting was that Professor Hueppe has been able from cultivations of the comma bacillus to produce death in the lower animals. The inability to demonstrate its action on the lower animals was one of the weakest points in Koch's original work. Dr. Hueppe's work seems to show this action very distinctly, and that was a valuable addition to our knowledge.

The Mouth as a Source of Infection.—Professor MILLER (Berlin) read a paper on this subject, an abstract of which will be found in another column. After the paper had been read a lantern demonstration was given, illustrating in splendid style the points referred to in the paper.—Sir JOSEPH LISTER, at the conclusion of the demonstration, remarked that we had good reason to be thankful that our bodies had the means of protecting themselves from those very numerous and very virulent organisms.

Dental Caries.—Mr. SEWILL followed with a paper on Dental Caries, in which he described the history of its development in healthy teeth. By subjecting extracted teeth to the action of the same agents under the same conditions as to temperature, moisture, and presence of micro-organisms as exist in the mouth, the author said that caries could be artificially produced which is indistinguishable from that occurring in living teeth. Acids and micro-organisms were the active agents in caries production. The great bulk of acid is the product of fermentation of the organic matter commonly present in the mouth and lodged around the teeth. These acids are often assisted in their action by acid secretions. Fermentation being due to action of micro-organisms, bacteria must be considered a prime factor in the causation of caries. Proliferation of organisms amidst the fibrils and in the organic basis of dentine formed an essential feature of the disease. Speaking of the prophylaxis of dental caries, he said that production of faultless dental tissues could only be brought about by improvement of the race and of the hereditary qualities of the individual. Little or nothing could be done to influence the structure of the teeth in the individual after birth, or in the fœtus through the mother. Crowding and irregularity of the teeth were due to smallness and malformation of the maxillæ, a characteristic of civilisation. Vitiation of the secretions of the mouth is to be prevented by maintenance of a high standard of health and by local hygiene.

Phagocytes.—Dr. ARMAND RUFFER gave an account of his investigations on the tonsils and Peyer's patches, in order to show how leucocytes come to the surface in these positions and take in particles of dust, coal, vermillion, &c., or it may be bacteria which he had found a little below the surface in the interior of these leucocytes in a state of degeneration. The phagocytes not only carried bacteria, but also solid bodies.—Dr. BAUMLER (Freiburg) commented on the foregoing papers, and stated that he considered this mode of infection to be a very important item in the causation of parotitis, septicæmia, and secondary affections.

Bacteria in the Small Intestine.—Dr. MACFADYEAN gave an account of certain investigations made in the laboratory of Professor Kocher at Berlin. By means of a fistula they were able to make investigations on the work carried on by the small intestines of man. They had studied the chemical processes at work. As a result of their researches they found that they could not isolate the putrefactive bacteria in the small intestine—a circumstance most probably due to the fact that the contents of the small intestine were acid, from the acetic acid which had been formed in them. The bacteria seemed to have very little action on the albuminous contents, but had a very intense action on the carbo-hydrates. They had found that all the bacteria in the small intestine produced alcohol as ethyl alcohol, which was found to be a constant product in the small intestine from this agency. There was a great physiological characteristic in the bacteria of the small intestine, by which they could be differentiated from those of the large intestine. In the small intestine the bacteria produce active fermentation upon carbo-hydrates, while the bacteria in the large intestines had a disintegrating action upon proteids.

Micromyces Hofmanni.—Professor MAX GREGOR (Vienna) demonstrated a new organism belonging to the hypomycetes, closely resembling in its morphological characters the actinomyces. The fungus is made of delicate branching hyphæ, with thickened, occasionally calcareous ends. When grown on sugar it produces acetic acid. Its pathogenic action is different from that of actinomyces in that it produces a local abscess, which opens spontaneously. Rabbits are especially subject to the influence of this agent.—Sir JOSEPH LISTER remarked that he was exceedingly interested in this paper. If an abscess were opened and a poultice applied to the wound the pus went on forming, but if the abscess were opened under antiseptic precautions and a small tube introduced into the wound, probably no more pus would form from the time that the opening was made. He believed that there was a pathogenic membrane, and while the inflammation was there kept up by the tension produced by the presence of pus, the inflammation impaired the phagocytic action.

Mr. BALLANCE and Dr. SHATTOCK contributed a paper on Cancer.

WEDNESDAY.

Immunity.—This Section resumed its work on Wednesday, under the presidency of Sir Joseph Lister, by a paper on Inoculation by Dr. ROUX of the Pasteur Institute of Paris, of which the following is an abridged translation:—Dr. Roux, in his paper, indicated the scope of the discussion in his opening sentence, in which he stated that, inviting a pupil of M. Pasteur to open the discussion on this subject, the organisation committee had reminded them that the numerous interesting works which had recently appeared on the subject had had one point in common—namely, the attenuation of virus and preventive inoculation, the two subjects with which M. Pasteur's name would to all time be honourably associated. With the single notable exception of vaccine, the only way of

conferring immunity against any disease was the inoculation of the virus of the disease. To the only method of producing immunity Pasteur had added the less dangerous one of preventive inoculation by means of an attenuated virus. The designation "attenuated" virus ought to be reserved for virus weakened without being attenuated—e.g., by artificially lowering the vitality of the organisms producing it. The two methods of attenuation were described by M. Pasteur—i.e., the prolonged exposure of a culture to air at a suitable temperature, and the passage of the organisms through the bodies of different species of animals. Other methods have also been employed—for example, the action of heat, the use of antiseptics, of compressed oxygen, and light. In all cases, whatever the method employed, it was found to be necessary that the attenuation should be effected slowly and gradually; rapid attenuation would render a virus altogether inactive, without impressing on it any hereditary weakness. However prepared, in order to confer immunity, the virus should be brought into contact with the tissues of the animal. In the early experiments the virus employed was always living—that is, the weakened organisms themselves were used. Another method was by inoculating the chemical products produced by the organisms. Continuing his paper, Dr. Roux dealt with the phagocyte theory of Dr. Metchnikoff. He said that Metchnikoff had discovered that amœboid cells were enabled to assimilate blood-corpuscles in their structure. The phagocyte cells originate in the mesoderm. They have also the property of being able to digest the bodies which they have ingested, and are the only cells which manifest in the human body any cellular digestion. If we follow the history of a bacterium in the interior of phagocytes, we see that they undergo a series of special alterations very different from what takes place when they die under cultivation. Whether we inoculate virus into the bodies of animals which resist inoculation, or whether we inject attenuated microbes into susceptible animals, the more refractory the animal is, the more rapidly will the microbes be consumed by the leucocytes. If, however, any non-resisting animal cannot resist the microbes, they remain free, and no such phenomena take place. It seems, therefore, that the phagocytes are intended to protect the organism, and that they contend against the parasites which infect the human frame. People will say that there are diseases in which microbes are found particularly in the cells, and which nevertheless cause the death of the cells. In tuberculosis and in leprosy the cells form the seat of the bacilli, and these are amongst the most serious diseases, in spite of the intense phagocytosis induced in them. This fact proves that the phagocytes and all the other means of defence are on certain occasions powerless to effect any good results. They have done their best to consume the microbes, but these have adapted themselves to the interior of the cells, and have conquered. But it is not sufficient that the microbes should be absorbed; it is essential that they should be digested by the phagocytes. Even in those cases where the struggle does not tend to the advantage of the organism, these phagocytes are still the aggressors. It has been frequently observed in tuberculosis and leprosy that the bacilli have been killed in the interior of these cells. Although the theory of this subject involves a struggle between the microbes and the cells, it does not imply that the bacilli always succeed. Phagocytosis only occurs in refractory animals, and not at all, or only incompletely, in susceptible animals. He asked whether immunity was the consequence of this property of the cells inglobulating the virus, or whether it was not possible that immunity existed on account of this absorption of the virus of the cells. If in refractory organisms they encircle the microbes it is perhaps because these latter are in favourable conditions and remain, so to say, inert in the interior of the receptive organism. Numerous facts have been alleged to show that the inglobulated microbes were not degenerated but in a condition of full vitality; it is noted for example that in frogs the bacilli which have been ingested by the leucocytes exist alive in the protoplasm of the cell, and show by their movements that they have been absorbed in living condition. Lymph taken from the body of a pigeon or a rabbit which has been inoculated with virulent bacteria, shows numerous leucocytes imprisoned in the bacilli, which can be seen growing under the eye of the observer within the interior of dead phagocytes, elongating and carrying with them the protoplasm, and changing the form of the cell and finally escaping from it. Another demonstration of the importance of the action of the phagocytes is, that even in refractory animals microbes increase when kept out of the reach of the leucocytes; thus, in the interior chamber of the eye of an inoculated rabbit, where there are no cells, the bacteria grow freely, and their development is only checked when the leucocytes, migrating in large quantities, have incorporated them. Phagocytosis is, therefore, a phenomenon, very efficacious for the defence of the organisms, and when it fails the organism succumbs to the virulence of the bacteria. But what mysterious force attracts the cells towards the microbes? Why are the leucocytes, which show the microbes in inoculated animals, incapable of seizing them in receptive animals? In 1883 Metchnikoff propounded his phagocytic theory. He admitted that the cells were attracted to the microbes in virtue of a tactile sensibility which they manifested towards all foreign bodies introduced into the tissues, and also that the property which they have of seizing the viruses in immune animals originates in a habit which results from their first struggle with the attenuated virus with which the animal had been formerly inoculated. These movements and these preferences of the leucocytes can be easily explained, because it had been found that the leucocytes had a special chemical sensibility, a chemical property, analogous to the zoosperms of the myxomycetes: they are attracted by certain bodies and repelled by others. MM. Massart and Bordet have proved that the products of the microbes exert a very marked chemical action on the phagocytes. When a virus is introduced into the body, it proliferates and forms a substance which attracts the leucocytes, but the more active the virus the more energetic are the poisons prepared by it; and it happens that the cells which have penetrated into this toxic focus are paralysed in their action and rendered incapable of inglobulating microbes, which flourish, therefore, without hindrance. There are even viruses such as that of the chicken cholera, the toxin of which exerts on the leucocytes a negative chemical action, and repels them from the focus of the inoculation, and thus there are never any phagocytes found in this particular affection. This, however, is not the case with the inoculated animals, which have been rendered immune either by inoculation of the attenuated virus, or by the injection of suitable doses of bacterial products. If the animal is given a strong virus, phagocytes attracted to the inoculation point, and already accustomed to the products of the microbes, will inglobulate the latter before it has had time to prepare effective doses of its toxic material. It is therefore at the commencement of the disease that the trouble takes place. If the leucocytes cannot interfere at the beginning of the malady, interference at a later period on their part will be useless: the microbes will have produced enough poison to paralyse their action. Every cause, therefore, that keeps away the leucocytes from the inoculation point facilitates the infection; the theory of immunity proposed by Metchnikoff does not deny that there might be other means of protecting the organism, but it affirms that the phagocytic action is of all these means the most extensive and most efficacious. It seems to account for all the facts and to be eminently suggestive; it is thus that the knowledge of microbic poisons and chemical inoculation have thrown light on what would otherwise have been obscure. Far from being shaken by the theories which were opposed to it, this theory of Metchnikoff had gained by the opposition which it had been met, and that was a guarantee of its genuineness.

Dr. H. BUCHNER followed with a paper in which he stated that up to the present no general theory of immunity had existed. By hereditary immunity was understood something specifically determined, dependent on specific physiological properties, both in the cause of the disease and in the animal body in which it was produced—namely, its organs and tissues. The bactericidal powers contained in the blood serum &c. were no doubt in casual relation with natural immunity. He concluded by saying that the theory of phagocytosis was based on microscopic observation, the accuracy of which could not be called in question. We were still ignorant of its scientific cause and the conditions under which it arises. In other words, it has not a sufficient experimental basis. On the other hand, the experimental results gained with blood serum proved for the protection of the object against infectious disease other factors are working apparently independently of the amœboid

movement; hence, it is in this direction that such factors that cause immunity both natural and acquired was, in his opinion, to be looked for.

Dr. HANKIN read a paper on this subject which will be found in another column.

Professor EMMERICH read a paper on the Artificial Production of Immunity against Croupous Pneumonia and the cure of this Disease. He said that immunity was produced by antibacterial toxine being inoculated into the body. The blood of animals made immune possesses not only a very strong bactericidal power, but can be used as a remedy in infectious diseases when injected subcutaneously into the abdominal cavity or into the veins of a diseased animal, as had been proved in dysentery of pigs and in the croupous pneumonia caused by the diplococcus pneumoniæ of Fraenkel both of these diseases were curable, and it was important to note that they could be prevented by inoculating animals a short time after they were infected.—Considering that the experiments of Dr. Doenissen had shown that the diplococcus of Fraenkel is the cause of the croupous pneumonia, we are entitled to assert that it is possible to cure men of pneumonia by the blood serum of immunised animals, especially if we succeed in producing this liquid chemically pure and use it in proper quantities.

Professor ARLOING summarised the earlier theories dealing with immunity. He showed that naturally immune animals have the power of resisting microbic poisons, due to a natural tolerance for the poison analogous to that met with in animals having acquired tolerance after treatment with attenuated vaccine.—Dr. KITASATO (Tokio) said that in his publication of last year, he had showed, in conjunction with Dr. BEHRING, that an injection of the blood of rabbits made artificially immune from tetanus with trichloride of iodine, rendered mice not only refractory to tetanus, but also cured the disease when already in progress. This fact proved that blood rendered artificially immune is really efficacious against a malady of an acute character like tetanus.—Dr. ADAMI (Cambridge) said the bacteriological world was at the present moment divided into two bitterly opposed camps—those who held that microbes within the system were destroyed by the agency of the living cells, and those who held that the function of microbic destruction was performed by the blood serum and body fluids in general. He wished to especially emphasise the fact that we had ample evidence to show that the controversy upon the subject turns, after all, upon phenomena which differ not so much in kind as in degree. The controversy tended rather to be words than actualities, and if we directed our observations aright it would be impossible not to be struck by the prevalence of phagocytosis. He was of opinion that those who were not in the thick of the fray must continually accept both views, and would point out that this position was far from being untenable. He said he need scarcely mention in this town that it was especially round the phenomena observed in the rat that this controversy had raged, that in the rat phagocytosis could be but with difficulty observed, and that the rat's blood-serum possessed bacteria-killing properties to a high degree.—Professor EHRLICH gave some opinions regarding ricini and abrin, the immunity produced by which depended on the presence of an anti-toxic substance. He referred more especially to the question of inheritance. The descendants of highly immune fathers were not themselves immune, while, on the other hand, the descendants of immune mothers were relatively immune, but in a less degree than the parent.—Professor HUEPPE (Vienna) said that the opinions on the part played by the cells and the blood serum were still very diverse. The cells, however, could afford to wait if justice was not being done to them, for they would come to the front again in due time. Experiments on chemical properties and trophic properties of cells had triumphantly established the primary cell effects, which had already been considered. In those effects they had to distinguish between the effects produced by the products of matter or organism from those of the cell protoplasm.—Dr. KLEIN, F.R.S. (London), referred to some experimental facts bearing on the question of immunity and susceptibility. Ordinary frogs and rats were immune from anthrax, but these animals had been made susceptible to anthrax by a variety of means, which seemed to indicate that there were certain chemical conditions at work. If the frog were inoculated with virulent material (say a piece of the spleen of an anthrax animal introduced into the lymph sac), and afterwards chloroformed, the frog always dies of anthrax. He had inoculated several animals under the influence of chloroform and ether. A rat was inoculated with anthrax material, and died on the fourth day. Several other instances of such effects were also given, and likewise the effects of inoculation, preceded and followed by chloroform administration. Dr. Coxwell and he had taken the trouble to investigate this point, and there was really nothing to see under the microscope that would justify anyone in saying that the blood corpsucles had lost anything of their power of swallowing up bacteria. Their experiments showed that certain chemical changes had been established in the blood, it may be, entirely independent of any leucocytes which were sufficient to destroy those substances, which are present in the blood of the frog, or the blood of the rat, which counteract the action of the anthrax bacteria.

Dr. METCHNIKOFF (Pasteur Institute), who was received with cheers, read a paper, of which the following is an abstract. He said several of the speakers had raised objections against the phagocyte theory, but it would be impossible for him to traverse all the points. Behring and Nissen, in the very important work carried on by them at the Hygienic Institute of Berlin, had discovered the bactericidal power of the serum of guinea-pigs which were protected against the vibrio Metchnikovii, and had demonstrated that this vibrio develops readily in the serum of guinea-pigs, but that in an inoculated animal they are destroyed within from three to five hours. Dr. Pfeiffer had never found these vibriones in protected guinea-pigs. The serum of the protected guinea-pig kills the vibriones in a very short time, whereas the serum of a non-vaccinated guinea-pig causes them to develop in great numbers. He was quite aware that the toxines have to be considered; but it cannot be urged in this case, because it is precisely in this disease that this important fact has been demonstrated for the first time—viz., that the animals completely protected against infection are as sensitive to toxic doses of sterilised cultures as animals not inoculated at all. This sensitiveness is shown by the death of the animal, which occurs after the same doses in the case of the inoculated guinea-pigs as well as among those not inoculated, and also in the inflammatory and febrile phenomena which accompanied them. This fact, discovered by M. Gamaleia, had been confirmed by Dr. Pfeiffer and by himself. The vibrio of septicæmia in guinea-pigs is that of an infectious disease, in which of all the protective factors known the phagocytes have the most important action. The bactericidal power of the serum, remarkable though it be, does not confer immunity in disease due to bacteria. The theory of the microbicidal power of fluids of the body whose insufficiency has been stated by one of its principal founders—Behring himself[1]—can, as we see, be of no use even in the two examples which seemed the most likely to prove his contention. The theory of the attenuating property of fluids has only a few facts to support it. The serum has sometimes the property of attracting the leucocytes, as was stated by Menart and Bordet for the serum of inoculated rabbits against the "pyogenic" disease, and by M. Roux and himself in the serum of rats. The question, no doubt, is complicated, and at all events needs fuller inquiry. He had failed to corroborate their results, because, in the case of rabbits protected against carbuncle and pneumonia, as well as the guinea-pigs inoculated against the vibrio Metchnikovii had supplied him with a serum which manifested no attenuating property against the above-mentioned microbes. Behring, the founder of the blood-toxic theory, has himself acknowledged that this theory cannot be easily applied except in diseases like tetanus and diphtheria, which are distinguished by their exceptionally toxic characters and by the absence of diffusion of microbes. As was proved by Vaillart and Vincent in regard to tetanus, the animals which are subject to this malady are already naturally refractory to the microbe. In this immunity from the microbe it is the phagocytes which play the principal part. If we discuss this theory fairly, and accept, for sake of argument, that the desired effect expressed by M. Ehrlich is realised—that is, that the crisis in infectious diseases is really due to the rapid formation of the anti-toxine,—it is seen that even the part played by the phagocytes is very important. Among the diseases in which a crisis occurs may be cited intermittent and malarial fever as the best known. Let us suppose that the crisis is really caused by

[1] D. Med. Woch., 1891, No. 19, p. 688.

the destruction of the toxine in the organism; but if once the microbe is left alive it can multiply itself again, and cause a relapse more serious than the first attack. We know now that the spirilla of intermitent fever are destroyed by the phagocytes during the crisis and the period of apyrexia. In monkeys, where the spirilla are destroyed by the cells, the illness terminates with the first attack; but in man, where the phagocytes have generally not been able to completely destroy the spirilla, a second attack is produced in spite of the formation of antitoxine. This is the same in intermittent fever. It is evident that only when the microbe is entirely destroyed (and deprived of life) that the organism can be considered free from it. Therefore, in this act of destruction of the microbes it is the phagocytes which perform the most important *rôle*, as has been proved in the case of anthrax and in numbers of other diseases, and, further, by the vibrio of septicæmia in guinea-pigs, arguments which seemed at first to be most favourable to the theory of the bactericidal power of the fluids of the body. Since the phagocytical theory has been propounded it has given rise to numerous objections based on theoretical considerations as well as on research and experiment. A great many very important facts have been discovered, and several theories of immunity have been set forth. But the more we go into the question the more it becomes evident that the army of phagocytic cells is in reality a salutary power, which is formed in the struggle of the animal organism for existence. At one time the phagocytes act alone, at another they combine with other factors which facilitate their efficiency. But in all these cases we see these cells combating the parasites. When the phagocytes are inactive, this is a sign either of a harmlessness of the microbe, or, on the contrary, of its extraordinary virulence. This theory of phagocytes, based on the evolution principles of Darwin and Wallace, can in its turn become useful in the study of the phenomena of organic evolution. In studying this subject we are, so to say, spectators of the struggle, and we have before our very eyes the phenomena of natural selection itself.

Dr. Fodor, Dr. Cartwright-Wood, Professor Babes (Bucharest), and Dr. Wright joined in the discussion.

The PRESIDENT (Sir Joseph Lister) said that if anything were required to justify this Congress it would have been their sitting that day. The immense amount of valuable material that they had had on this most important subject had been, he was sure, such as to make all members exceedingly grateful to those who had brought these matters before them and well pleased with the success of the Congress.

BACTERIOLOGICAL MUSEUM.

The secretaries who have organised this department, Dr. Armand Ruffer and Mr. Andrew Pringle, are to be congratulated on the success which has attended their efforts. In two well-appointed and commodious rooms in the London University, this museum presented what must have formed to members of the Congress one of the most attractive features of the great meeting. One of the sections of the museum was devoted to specimens representing modes of cultivating bacteria and methods of examining them microscopically. In the other section the space was devoted to exhibits of the apparatus required for their investigation and culture. Thus, in the one department Dr. Bokenham exhibited various cultures of the microbes of erysipelas and diphtheria and several colour-producing organisms; Professor Nocard of Paris had specimens of tubercle and glanders in the ox; Dr. Adami of Cambridge demonstrated the modifications which are exhibited by colour-producing bacteria in different cultivating media. Dr. Washbourn had a very extensive display of preparations showing everything connected with anthrax and also several specimens of glanders. Professor Crookshank of King's College had sent in examples of cultivations and microscopical specimens of tubercle and actinomycosis. A specimen of tubercle bacillus found in cream, from milk taken from a tuberculous cow and sold to the public, was worthy of notice. The trichomonas sanguinis, an organism found in the blood of over 25 per cent. of healthy rats, was likewise shown. A feature of the museum was the display of ancient literary works bearing on the germ theory of disease from the time of Athanasius Kircher, 1646, down to the present time. Sir Hugh Beevor exhibited cultures of tubercle bacilli in different media and at different temperatures. Messrs. Henry Sewill and Pounds illustrated at their table the bacteriology of caries of the teeth by means of photo-micrographic specimens and natural microscopic preparations. In one instance they afford a proof that caries is due to external causes, by exhibiting a preparation of a natural tooth, which had been removed in a healthy condition, fixed on a plate, and worn as an artificial tooth, and which afterwards manifested all the naked-eye and microscopical appearances found in cases of natural caries. Mr. C. J. Pound exhibited some beautiful drawings and diagrams, executed by himself, illustrating the forms of bacteria, the spore formation of bacilli, various forms of colonies of anthrax, proteus, figurans, mycoides, &c. One plate showed certain actinomycoses which were found in a piece of Australian beef which had been roasted and served at table. Specially noteworthy were the drawings of a section of the skin of a leper, showing the bacilli in dense masses, a colony of the oidium, human and bovine actinomycosis, and a beautiful specimen of the coccidium. One specimen procured in Queensland, New South Wales, and Tasmania, was exhibited by Mr. Parkes, which demonstrated that the actinomycosis in the ox was exactly similar to what has formerly been associated, if not supposed to belong exclusively to that disease in man. Dr. Klein exhibited various cultivations of diphtheria from the human being, the cow, and the guinea-pig, and the organisms found in his investigations at Middlesbrough, various species of streptococci, the Edinburgh disease—an eruptive disease of the cow found in Edinburgh, the milk from which had produced febrile symptoms in the children of an institution in that city. Eight different species of cholera bacilli were shown and numerous lantern slides prepared by Mr. A. Pringle and Dr. Bousfield. Dr. Wethered showed cultivations of various organisms. Dr. Kral of Prague displayed a number of cultivations in hermetically sealed vessels which afford a convenient and time-saving means of using and keeping these anaerobes. Most interesting are the stick cultures in gelatine in flat test tubes, enabling them to be microscopically examined, and the beautiful plate cultures on agar, with typical colonies of enormous size; the turnip cultures, among which we may specially mention actinomycosis, showing a growth of several centimetres; the real achorion schoenleinii, with a new method, which allows the isolated growths of single germs of favus and similar diseases, isolated by Dr. Kral, and various saccharomycetes, all of which are luxuriously developed, and show air filaments. Still more interest will be shown in the cultures on agar plates and the cultures on potato slides. Indeed, we may state that no clinical or theoretical institute ought to be without such a collection where bacteriological investigation is going on; and no physician should neglect the opportunity of making acquaintance with the dreaded producers of disease which Dr. Kral has most skilfully and securely enclosed, fitting them to be examined without danger of infection. Mr. Karg of Leipzig exhibited various slides showing the effect of Koch's fluid on facial lupus, lupus of the forearm, and on the synovial membrane of the knee-joint. Sir Henry Roscoe, F.R.S., and Mr. Joseph Lunt, B.Sc., exhibited jointly some complex apparatus used in an investigation on the dissolved gases in water. These consisted of an apparatus for the extraction of the dissolved gases from water by boiling in vacuo and collecting the dry gases by means of a mercury pump, a special form of apparatus adapted for the analysis of the gases so extracted, and a new form of apparatus for the estimation of dissolved oxygen in water. They also exhibited some beautiful photographs, executed by means of the simplest extemporised apparatus, illustrating the bacteriology of sewage, showing not only the bacteria as they appear under the highest powers of the microscope, but also the characteristic gelatine plate and tube cultivations. The photographs were all excellently reproduced by the Autotype Company, and the copies were placed side by side with the originals, testifying to the accuracy of the purely mechanical methods by which they were reproduced. Under the microscope many of the original preparations were on view, noticeable among them being a fine cover-glass impression of bacillus figurans. Messrs. R. and J. Beck have upon exhibit in the centre of the room a large showcase, in which samples of every microscope, microtome, and almost every piece of microscopic apparatus which is made by this enterprising firm are shown. The whole catalogue of the firm is illustrated, and on the first table to the left is to be found a complete selection of apparatus and appliances for the preparation,

mounting, and staining microscopical specimens. The microscopes in this department have been lent for the demonstration of bacteria by Messrs. R. and J. Beck, the "Star," "Biological," and "Pathological" microscopes being in use on all the tables. We are informed that Messrs. Beck have placed between 150 and 200 microscopes at the disposal of the Congress, and have spared no trouble or expense to provide the department with all necessary lenses and apparatus.

In that portion of the museum devoted to the various apparatus employed in bacteriological research, Messrs. Lautenschläger of Berlin had a remarkable display of incubators, sterilisers, &c., embodying new principles, and this firm showed a model of Professor Koch's new incubator fitted with an electrical apparatus for regulating the temperature. Microtomes in all varieties were shown by the various exhibitors, and Mr. Stanley of London presented some excellent cabinets for containing microscopic slides. Mr. Odelga of Vienna showed sterilised bandages and many other appliances. The Brackenfeldt Filter Company had a good display of their Kiesselguhr filters. Gallen, Kamp and Co. showed an apparatus for sterilising culture media by means of an air-pump. A well-made and efficient microtome was that exhibited by Dr. Délépine. The chemical products exhibited by Professor Hueppe included salol, solutol, sodium dithiosalicylic, and many others belonging to the same chemical group. Dr. Grubler, who was represented by Mr. R. Kanthack, had a very good display of various stains and reagents used in microscopic technique. A stall with exhibits bearing on the same subject was that of Alvergniat Brothers of Paris, who were represented by V. Chabaud. Microscopes were exhibited in abundance, as well as all the appliances for microscopical work. Messrs. Powell and Lealand exhibited a capital stand known as No. 1. Mr. Crouch of London had a fine collection of stands, as had Mr. Swift of London, who also exhibited a Welsbach lamp fitted for microscopic purposes. Mr. Frazer of Edinburgh showed an incubator and a combined hot-water filter and steam steriliser. A set of what Mr. Pringle has aptly labelled "retention instruments" were exhibited by M. Mariaud of Paris. Baird and Lothian of Edinburgh had a fine display of cultivation jars, glass receptacles for air testing, and several modifications of Bunsen burners for use in bacteriology. A curious ingenious microtome was the "Caldwell," exhibited by Dr. Bousfield. Messrs. Griffin exhibited Dr. Klein's incubator, several sterilisers and patent burners. The Cambridge Scientific Instrument Co. showed several microtomes and instruments for measuring the volume of organs under observation. A similar exhibition was provided by Messrs. Beck and Co. The firm of Johnson and Co. had a fine display of microscopes, and the Hygienic Wood Wool Co. had a stall which excited considerable interest.

SECTION III.

THE RELATION OF DISEASES OF ANIMALS TO THOSE OF MAN.

The President, Sir NIGEL KINGSCOTE, offered a few words of welcome to the delegates. He said that the importance of the subjects they had met to discuss was such that they affected all classes of the community. The relation of the diseases of animals to man had been a subject more or less of speculation from the earliest times, and it was only comparatively recently that the subject had been scientifically dealt with. The anatomical and physiological relations between the lower animals and man were sufficiently close to justify the presumption that they were liable to the same diseases. It was their duty to find out how best to combat the attacks on the human body of the many virulent germs which threatened them.

The Propagation and Prevention of Rabies.—Dr. E. ROUX, of the Pasteur Institute, Paris, read an interesting paper on the prevention of rabies after the bite, and the results obtained in the Pasteur Institute by anti-rabic inoculations. It is a little over six years, as Dr. Roux pointed out, since the first human being was inoculated as a preventive against rabies, and during those six years Pasteurism has undergone much and severe criticism, especially at the Hygienic Congress assembled at Vienna in 1887. So many people have, however, now been treated by this method that it is possible to examine the statistics kept, without fear that the present and ultimate benefits of Pasteurism will be contested. Detailing the manner in which the virus was prepared and the injections administered, Dr. Roux passed to the consideration of the question of the quantity of lymph necessary to secure immunity without endangering the life of the patient. The doses of the emulsion vary from 3 cc. of weak lymph to 1 cc. of strong lymph, the quantity of dry nervous matter employed being about one centigramme for each person and for each injection. For ordinary bites on the limbs the treatment consists of inoculating for the first four days with 3 cc. doses of the emulsion from lymph, varying from fourteen days to seven days old; from the fifth to the eighth day with 2 cc. doses of lymph six to four days old, and so forth, beginning with injecting great quantities of weak lymph one after another, in order that the patient may the more readily bear repeated doses of active lymph. The patients treated at the Pasteur Institute are divided into three classes: 1. Table A comprises people bitten by animals known to be rabid, experimentally—i.e., animals which have been inoculated and have become rabid, and have then bitten other animals or men. 2. Table B comprises people bitten by animals recognised as rabid by veterinary surgeons. 3. Table C is reserved for people bitten by animals suspected of being rabid. The statistics are up to Jan. 3rd of the present year:—

Years.	Tables A and B.			Table C.			Total.		
	Treated.	Deaths.	Mortality.	Treated.	Deaths.	Mortality.	Treated.	Deaths.	Mortality.
1886	2164	29	1·34	518	7	1·35	2682	36	1·34
1887	1518	17	1·12	260	4	1·54	1778	21	1·18
1888	1377	11	0·80	248	1	0·40	1625	12	0·74
1889	1536	7	0·46	298	3	1·00	1834	10	0·54
1890	1330	9	0·67	216	2	0·92	1546	11	0·71
Grand total.	7925	73	0·92	1540	17	1·1	9465	90	0·95

From this it will be seen that a total of 9465 people have been treated during five years, with a total of 90 deaths; or, in other words, 0·95 per cent., a very small number as compared with the 12 per cent. or 14 per cent. of the mortality of those bitten and not treated. Out of these 9465 people 1551 were foreigners and belonged to twenty different nations. These contributed 24 to the deaths—i.e., 1·29 per cent.,—but this higher rate of mortality is easily explained by the length of time which elapsed before treatment in many cases. English people to the number of 389 have been treated in the institute at Paris, their mortality being 1·8 per cent., but many amongst them were very severely bitten, and did not present themselves for treatment until several days had elapsed. As regards the inoculation necessary to produce complete immunity, it appears to be evident that inoculation with active lymph must in every case be practised at the close of the treatment. Dogs injected with direct lymph have had immunity at the end of three years. In man, lymph three days old is sufficient, especially if it is injected several times. M. Pasteur is of opinion that beside the living but modified virus contained in dry lymph there exists certain special chemical products elaborated by the microbe of rabies, which are partly responsible for the production of the immunity, so that in anti-rabic inoculations there is chemical vaccination and vaccination by the living virus at the same time. Numerous experiments will, however, yet be necessary to settle this question.

One point upon which Dr. Roux insisted was the absolute purity of the lymph employed in the injections. In the Pasteur Institute, in spite of the immense number of inoculations, suppurations are very rare, and where they have occurred have generally been traceable to some negligence. The diminution in the mortality amongst patients treated by the Pasteur method has steadily decreased, and shows that immunity from rabies is the result in the majority of cases. The mortality, which in 1886 reached 1·34 per cent., fell to 0·54 per cent. in 1889 and reached only 0·71 per cent. in 1890, and since the commencement of this method of treatment institutions similar

to the Pasteur in Paris have arisen in Russia, Italy, Turkey, Brazil, the United States, and other countries, a fact which speaks volumes for the discoveries of M. Pasteur, which have hardly emerged from the laboratory before they have been put into universal practice.

Professor GEORGE FLEMING followed with a paper on the Propagation and Prevention of Rabies, which is published in another column.—The discussion was opened by Dr. J. BARDACH, Director of the Bacteriological Laboratory at Odessa, who gave his experience of the results of the preventive inoculations which had been carried out there. During the time the institute had been working 2293 people had been treated, and 16 of them had died; but if those cases were excluded in which death followed within two weeks, and therefore before the protective influence had time to assert itself, the results were that 2238 persons were treated, with 11 deaths, or a mortality of 0·49 per cent. He then further analysed his cases, showing the percentage mortality after bites in different parts of the body.—Dr. HIME said that the use of the collar had been very adversely criticised, but if it were engraved with the name and address of the owner it served to trace the source of the infection. Muzzling, as carried out at the present day, was a perfect farce. He considered that allowing a dog to have his first bite should be abolished, and he concluded by quoting cases illustrating the efficacy of the Pasteur treatment.—M. NOCARD said he wished to say something about a prophylactic treatment after biting which was applicable to domestic animals. He had been able to preserve from rabies sheep which had been inoculated with hydrophobic virus twenty-four hours previously. Recently he had carried out experiments which proved that intravenous injection of hydrophobic virus did not give rabies to equines; that if the quantity of virus injected had been sufficient, the equines inoculated had acquired immunity against rabies; that it was possible to preserve the equines inoculated by intra-ocular injection by injection into their veins at different intervals of notable quantities of attenuated nerve substance taken from animals with dumb-madness. If one reflected on the considerable number of horses, cattle, and sheep which took hydrophobia after being bitten by mad dogs (nearly 80 per cent. mortality), and if one estimated the pecuniary value of those animals, no one could judge of the value of this prophylactic treatment which flowed from the work of M. Galtier. It was incontestable that wherever muzzling was rigorously applied hydrophobia diminished; but this result only followed indirectly from the muzzling. The same result followed when it was ordered that each dog should be led when in public. In Paris during April, 1888, 125 dogs became mad; then the order to lead them came into force, and in six weeks the monthly average was reduced to twenty-five. The truth was that it was not necessary to invent new sanitary measures to suppress rabies, but to apply exactly and rigorously those very simple measures which were actually in force in nearly all civilised countries.—Dr. DRYSDALE had followed carefully the Pasteur treatment, and thoroughly agreed with it. He very strongly advocated the muzzling of dogs throughout the kingdom for a year, and being surrounded by sea we ought to be able to apply such a measure thoroughly.—Professor REDFERN of Belfast referred to rabies as a terrible malady which ought not to be allowed to occur. The authorities in this country had certainly been very supine about the matter, and he wondered how the ridiculous system of local muzzling could ever have been applied in a civilised country. He thought that the Section ought not to separate without passing a very strong resolution on the subject.—Professor OSTERTAG of Berlin said that muzzling had produced excellent results in Germany. In Berlin there had been no case of rabies for ten years, and there had been very few cases in other parts of Germany. It had only appeared along the borders of France and Russia, especially where there were wolves. In every district where a mad dog appeared the bitten animals were killed, and for a distance of about three German miles all the dogs were either locked or chained up for three months. The result of this was that in Germany a Pasteur institute was unnecessary because there was no disease.—Sir HENRY SIMPSON of Windsor said that it was important not to lose sight of the practical side of the question, considering that sporting dogs were well cared for, and that their owners were true lovers of dogs, it would be needless to muzzle them, but they should be kept in charge of competent persons. Any deviation from health should be at once noted, and an inspection made by a properly qualified veterinary surgeon. On his report would depend the question whether the animals should be put into quarantine.—Dr. ELIZABETH BLACKWELL called attention to the sufferings of dogs made mad to produce virus. She had herself visited the Pasteur Institute and had seen a series of dogs in various stages of induced madness.—Both M. ROUX and Dr. HIME affirmed that no dog had ever been made mad to cure a human being.—Professor BROWN agreed with every word laid down by the authors of the papers. If the Congress by the weight of their opinion could induce the Legislature to pass an order to muzzle all dogs for a year, or for as long as was necessary, a great boon would be conferred.

Parasites.—The next paper was by Dr. RAILLIET (Alford), on the Parasites transmissible from Animals to Man considered specially from the point of view of Prophylaxis. His conclusions were as follows: 1. The parasites transmissible from animals to man were either vegetable or animal. 2. The vegetable parasites included, besides the bacteriaciæ or microbes, and divers saprophytes that were only accidentally parasitic, the fungi (trichophytæ) which caused the several affections designated by the name of "tinea." 3. The animal parasites might be divided into external and internal parasites. 4. The external animal parasites were either temporary parasites which attacked man for the same reason as animals (Tabanidæ muscidæ, &c.), or stationary parasites, either periodical (Isodes trombidium) or permanent (Sarcoptes scabiei, Sarcoptes minor). The transmission of these stationary parasites might be direct or indirect. 5. The internal parasites were nearly all stationary: (*a*) Some were common to man and animals, or, living more especially in animals, might develop accidentally in man (several Coccidia, Lamblia intestinalis, Balantidium coli, Tænia canina, Tænia echinococcus [larva], Bothriocephalus latus, several Distomata, Trichina spiralis, Filaria medinensis, Linguatula rhinaria, &c.). Now man and animals got these parasites from the same sources, and the transmission in this case was most often indirect. (*b*) Others must necessarily penetrate into the organism of man in order to complete their evolution, and hence their transmission was always direct (Tænia solium, Tænia saginata). 6. Indirect transmission took place very generally through the medium of drink or food, which animals had polluted or infected by depositing ova or embryos. Two cases might then present themselves: (*a*) the parasites, living in any adult state in animals, were capable of attaining to the same state in man (Coccidium oviforme, Bothriocephalus latus, Distoma hepaticum, Strongylus paradoxus); (*b*) the parasites, living in an adult state in animals, only developed to the larval stage in man (Tænia echinococcus). 7. Direct transmission was brought about by the consumption of the flesh of infected animals. In this case the parasites, living in the larval state in animals, attained to their complete development in man (Tænia solium, Tænia saginata, Bothriocephalus latus, Trichina spiralis). 8. Prophylaxis must be regulated by the indications furnished by the preceding data: (*a*) So far as concerned external parasites, man ought, as far as possible, to avoid contact with animals suffering from parasitical affections transmissible to his species; he ought to endeavour to destroy the parasites and their progeny, not only in those animals themselves, but also in all spots which might have been infected; (*b*) since internal parasites were introduced generally through the medium of food or drink, it was expedient only to consume these substances after a careful examination, and after having purified them, where necessary, by boiling, filtration, or other means; (*c*) certain sanitary measures might contribute effectively to the completion of the protection.

A paper was likewise read by Dr. BLANCHARD (Paris) on the non-microbic vegetable parasites transmissible from animals to man and *vice versâ*.—Professor BROWN gave an interesting address on parasites, illustrating his remarks by lantern slides. He showed illustrations of mutualism, commensalism, and parasitism, and gave an account of the life history of the trematode, nematode, and cestode worms.—Professor PACCHIOTTI (Turin), in commenting on M. Blanchard's paper, related two instances of actinomycotic infection of the skin in human beings.

WEDNESDAY.

Food Poisoning.—The proceedings were opened on Wednesday by a paper by Dr. EDWARD BALLARD on Meat Infection: Food Poisoning. The conclusion of the paper

showed that the precautionary measures against such food poisonings consisted mainly in (*a*) thorough cooking; (*b*) the most scrupulous cleanliness and ventilation of places where cooked food was stored, or where pork or other flesh-meat was salted and dried or otherwise prepared, with the adoption of every possible precaution against the rise into these places of ground air, or the introduction into them of morbific or unwholesome emanations.

Mr. VICTOR C. VAUGHAN discussed the infection of meat and milk under the following heads:—(1) The infection might be due to disease of the animal from which the food was obtained; (2) to inoculation of the foods with specific pathogenic microbes outside the body of the animal from which the food was derived; (3) meat and milk (especially the latter) were often affected with saprophytic toxicogenic bacteria. He referred to the observations of Gärtner of Jena on the epidemic which followed the eating of meat from a cow which died of diarrhœa, and likewise alluded to other similar instances of food poisoning. The disease known in Japan as kakké, and said to be identical with beri-beri, was prevalent at Tokio from May to October every year, and was due, according to Miura, to an intoxication from a fish. With regard to the transmission of tuberculosis from bovine animals to man by the ingestion of flesh or milk, he would be willing to endorse the following propositions:—(*a*) That the flesh of tuberculous cows, even when the disease was localised in the lungs, should not be eaten by human beings; (*b*) when the tuberculosis was general there was danger of specific infection through eating of flesh or drinking of milk; and (*c*) that when there was tuberculosis of the udders the specific infectivity might be transmitted through the milk. Koch thought the milk contained the bacillus only when the milk glands were affected, while Böllinger and others found the milk infected even when the disease was confined to the lungs. He held that the observations of Power and Klein on the Hendon cows showed the necessity of careful veterinary inspection of all dairies. The frequency with which typhoid, diphtheria, and other infectious diseases were disseminated by the use of milk infected from without was shown in the current records of medical literature. He exhibited a micro-organism which he had isolated from the milk and the well-water of a dairy, the clients of which had suffered from typhoid fever, and he had also isolated the chemical poison produced by the germ. He directed his remarks more especially to the infection of meat and milk with saprophytic toxicogenic germs; to which, he said, too little attention had been paid. The poisons found in meat and milk were either the ptomaines produced in foods as a result of the activity of saprophytic bacteria, and might properly be called putrefactive alkaloid or the poisonous bacterial proteids, the latter being most frequently present. We knew now of the existence of a poisonous base and of poisonous proteids in cheese. The poisons were due to a variety of germs, and the chemical nature of the products varied not only with the kind of germ but with the stage of putrefaction. To prevent this poisoning of cheese, to the dairies there should be attached a bacteriologist who should thoroughly acquaint himself with the germs and moulds which were necessary to proper fermentation and ripening of cheese, and pure cultures of these should be added to the milk, all other organisms being excluded. A great deal of infant mortality was due to the workings of saprophytic organisms producing diarrhœa. To prevent this, sterilisation of milk had been recommended, but it had not given good results because it was difficult of application; there was no evidence that the chemical poison was destroyed, and the food often reinfected in the infants alimentary canal.—Dr. BLANCHARD (Paris) desired to say a few words about the poisonous effects following the ingestion of the flesh of the higher animals. These intoxications had been called "botulism" (Lat. *botulus*, a sausage), and included poisoning by all kinds of meat. As was now well known, putrefaction of meat was due to microbes which had invaded it, and which produced chemical substances—ptomaines, the majority of which were eminently toxic. Though this was the most common cause of meat poisoning, yet all cases could not be explained in this manner. There existed, indeed, a large number of animals whose flesh was normally toxic, independent of any putrefaction or morbid state. He referred to eels, from whose blood Professor Mosso had isolated a venomous substance—ichthyotoxine, and he alluded to the intoxications produced by different fish in the sea of Antilles (Meletta venomosa) and in the sea of Japan (Diodon, Tetrodon). In the meletta the principal poison resided in the muscles, while in the Japanese fish it was seated exclusively in the genital glands; the intoxication here was due to ingestion of leucomaines. "Botulism" should be reserved for cases of intoxication by meat invaded by microbes, while the term "signatere" was the name given by the Spanish doctors to the intoxication by fresh meat free from microbes, but charged with leucomaines. Under botulism would be also included the intoxications produced by ingestion of the flesh of animals seized with infectious maladies, and whose tissues were consequently charged either with ptomaines elaborated by the pathogenic microbes, or with leucomaines produced by the organs working faultily through disease.—Professor BROWN said that it was quite clear that there were microbes having no special morphological stock which might undergo various changes under cultivation, and which produced unanticipated effects. The bacteriologist was at present somewhat hampered with his cultivating medium. It was well known that some organisms would only grow in the presence of air, while others refused to grow under such conditions. Whilst doubting the practicability of Mr. Vaughan's suggestion that every cheese-maker should employ a bacteriologist, he thought that something might be done in this direction. While some dairies were model institutions, the ordinary surroundings of the dairy in the typical country district were most filthy.—Dr. KLEIN said that we had been persecuted by the word "ptomaine," which had often been used by those ignorant of its meaning simply to prevent further inquiry. He then described a series of cultivation experiments he had undertaken with meat poisons, and showed by means of lantern and screen a series of photographs from the "Welbeck" cases, and the poisoning cases Nos. 9 and 13 in Dr. Ballard's paper.—Professor FLEMING said that the situation and condition of some private slaughter-houses were disgraceful. It was important to study how best to prevent the occurrence of these affections; how to obviate, for instance, putrefactive changes in canned meats. A systematic inspection of slaughter-houses ought to be insisted on.

Diseases of the Cow.—Dr. KLEIN read a paper on infectious udder diseases of the cow in relation to epidemic diseases in the human subject. He said that he had experimentally produced in cows, by inoculation under the skin of the shoulder with cultures of the diphtheria bacillus, an eruptive disease of the udder, which was described in the full paper, and which belonged to the same category of eruptive diseases as the above; visceral disease in these cows was also a prominent feature. At a particular stage of the eruptive disease experimentally induced, the milk of the cows was shown to contain the diphtheria bacilli.

Dr. KLEIN also made short communications on Asiatic Cholera; Diphtheria; Immunity with reference to Phagocytosis; and on Tuberculosis. He illustrated his remarks with the lantern and with a large number of micro-photographic slides. He demonstrated the several species of cholera comma bacilli isolated by Dr. D. D. Cuningham from typical acute cases of cholera; and further showed that the method first described by Koch for showing the specific pathogenic action of the cholera bacilli on the guinea-pig were not evidence of these microbes being the cause of cholera in man, since other microbes, liquefying gelatine, possessed under the same methods of experimentation the same effect on the guinea-pig as the cholera bacilli. He described diphtheria in the cow after inoculation with culture of the diphtheria bacillus, and showed the presence of the diphtheria bacilli in the milk of such cows in several instances; he also described a new species of pseudo-diphtheria bacillus. He described several diseases artificially produced in animals in which, owing to the chronic and attenuated character of an otherwise fatal disorder, the phagocytes might have been expected to be present, but in which they were altogether absent; on the other hand, he described an acute, rapidly fatal infectious disease in animals, in which, amongst crowds of foreign bacilli, numerous phagocytes were also present, which evidently were without any influence on the course and virulence of the disease. He spoke of certain chemical changes induced in the frog and rat by which these animals became susceptible to anthrax, the morphological and biological conditions as regards the lymph cells remaining unaltered. He described experiments showing that the tubercle bacilli attenuated in virulence by

cultivation, on being again passed through animals, gradually reacquired their former full virulence.—Dr. CROOKSHANK intended to deal with the alleged origin of scarlet fever from the cow. The disease in the cow had been described as a vesicular affection of the teats conveyable from one cow to another, and capable, when taken with milk, of producing scarlet fever. The theory of this method of production of scarlet fever was elaborated after Mr. Power's statement that there was no human infection. But of course it was impossible to prove a negative, and it appeared certain that scarlet fever did exist at no great distance from the dairy. It was pointed out by the Agricultural Department that the disease had been imported from Derby. The organisms which had been shown he felt sure were bovine and human varieties of streptococcus pyogenes; they were not in themselves a specific contagium, but only occurred as complications in scarlet fever and other diseases. He himself had pronounced the affection to be cow-pox, and as that disease was thought to be extinct at the time, this opinion of his was received with ridicule. He did not believe that the cow could be affected with scarlet fever, but maintained that it was the privilege of certain animals to be the natural soil for certain diseases; for instance, the pig was the natural soil of swine fever; the cow of pleuro-pneumonia; the horse of glanders; and man of scarlet fever and measles. He concluded by saying that we ought at least to be thankful to Dr. Klein for having brought these diseases of the teats into prominence.—Dr. OSTERTAG of Berlin referred to their experience in Germany of cow diseases. The experiments of Loeffler went to show that scarlet fever could not be carried from men to cattle. The general opinion was that Dr. Klein had confounded the affection he had described with either cow-pox or with foot-and-mouth disease.—Professor MACFADYEAN confessed to being as incredulous as ever that Dr. Klein had proved that there existed such a disease as scarlatina in the cow. He protested against the great fallacy which was continually introduced, that because a competent medical officer had sought for evidence of human infection and had not found it, that therefore such infection did not exist. He was glad to have the opportunity of putting Dr. Klein right as to a statement he had made with regard to the Edinburgh outbreak. There was no evidence that the eruptive disease there had produced sore-throat. The cases of sore-throat which had been observed ceased on Nov. 8th, whereas there were cows remaining affected as late as Jan. 7th.—Professor WALLEY (Edinburgh) said that during a thirty-five years' veterinary experience he had never seen any case of disease in cows that bore any resemblance to scarlet fever. The characters of the ulcers as to depth &c. could not be taken as conclusive; to judge of them they must be watched from start to finish. Again, the eruption would become materially altered by the entrance of extraneous germs. Dr. Klein seemed to differentiate no less than three udder diseases—that of Hendon, Wiltshire, and Edinburgh. He himself was only able to differentiate one affection from cow-pox, and that was pustular fever. He agreed that the affection should be dealt with as a contagious disease so far as human health was concerned. Referring to the Edinburgh epidemic, he said that he took one of the affected cows and fed a calf with her milk for three weeks, with no bad results to the latter. The family to whom the cow belonged used the milk and butter themselves, and none of them suffered from so doing.—Dr. W. HUNTER (London) complained of Dr. Klein's want of knowledge of the clinical symptoms of disease in the lower animals. He criticised adversely Dr. Klein's conclusions with regard to both scarlet fever and diphtheria, referring to them as baseless theories which had been thoroughly refuted.—Dr. ARMSTRONG (Newcastle) referred in detail to his report of the epidemic which occurred among the cows there; the animals certainly showed an appearance of skin which was peculiar. The significance of sore-throats occurring in this connexion was a matter of great importance. He had been called upon to treat cases of scarlet fever which were not true instances of the affection, but only, so to speak, "sports" of it.—Dr. TURNER (Broxbourne) said that because veterinary surgeons had not yet appreciated the importance of this new affection of cows' nipples, it did not follow from that that it should be disregarded. He described minutely an outbreak of diphtheria the origin of which he had traced to a dairy. The cows had vesicles upon the udder which Klein recognised as like others he had seen. When the milk-supply from this source was cut off no more cases of diphtheria or sore-throat occurred.—Dr. W. J. COLLINS remarked that the friendly rivalry apparently existing between the Government departments had stimulated bacteriological research. It was certainly remarkable how wonderfully diseases of cows' nipples had increased of late. It appeared to him that the differences between the Hendon and Wiltshire diseases were only those of degree. Could Dr. Klein give some means of discriminating true cow-pox from other diseases of cows' nipples—some difference which was chemical or morphological?—Dr. HIME (Bradford) said that Dr. Klein's position seemed to him to be that of a noble man struggling with adversity. He said that scarlatina was always endemic in Bradford, and though he had had several opportunities, he had been unable to identify the spread of scarlet fever with contamination of the milk-supply. He found that no less than 4000 people were supplied from the dairies which had been suspected and examined by him on account of the affection of an *employé* by scarlatina, and it was a curious fact that there were a smaller number of cases among those 4000 than among any other 4000 in Bradford, so that if he pushed his conclusion he might say that it appeared to be of advantage to have one's milk supplied from a dairy some attendant of which was ill of scarlet fever.—Dr. BOSTOCK HILL (Sutton Coldfield) referred to the outbreak of an epidemic of diphtheria which occurred in houses supplied from one dairy. The milk was distributed through three sources, and the majority of cases occurred in the run of the largest distributor. A cow which had recently calved got poorer instead of fatter, and there were marked patches of hairlessness on its hind quarters. On one teat was an ulcer discharging fluid. The cow was stopped from the supply for a month, and not a single case occurred, though previously there had been forty cases, with a mortality of 0·5 per cent.—Professor BROWN, though he deprecated the idea of there being rivalry between the two departments of State, yet thought that it was a pity they were engaged in making investigations and experiments without concert. It would certainly be to the public advantage if the medical and veterinary departments could agree, in cases of this kind, to conduct a conjoint investigation. He commented at length on the evidence Dr. Klein had adduced as to the alleged connexion between human scarlet fever and cow disease.—Professor CHAUVEAU had not himself made experiments lately with regard to this subject, but he related the results of some experiments by his colleagues.

THURSDAY.

Milk-supplies and Disease.—On Thursday Dr. OSTERTAG (Stuttgart) read a paper on the inspection of milk supplies with regard to the prevention of disease. He said that most countries had till now paid but slight attention to the sanitary question of the milk-supply, and had contented themselves with forbidding the sale of adulterated milk or of milk from diseased animals, without taking proper steps to ensure obedience to their orders. A praiseworthy exception to this was to be found in the Italian law of provision supplies of Aug. 3rd, 1890. It was the undeniable duty of the State to see that only pure milk entered the market. The consumer was not in a position to guard himself against the manifold dangers which attended the consumption of milk, which might contain the most harmful ingredients in spite of white colour and sweet taste. Such milk could only be banished from the market if the milk-supply was controlled by Government officials. Only pure milk could be tolerated in the market—that was, milk obtained with the greatest cleanliness from healthy animals, and possessing normal physical qualities and a certain degree of strength. For sanitary reasons the following kinds of milk must be excluded from the market:—(1) Milk which, without being necessarily prejudicial to health, was peculiar in colour, taste, or consistence—nauseous milk; (2) all milk that was prejudicial to health, or which was suspected, on good grounds, of being so. To the first group belonged colostral milk, blue, red, and yellow milk; further, slimy, thready, bitter, salt, as well as abnormally smelling milk, and milk that had been made impure by mud or other substances. The milk of animals that had been fed on poisonous fodder, or that had been treated with certain medicaments, and of those suffering from tuberculosis, malignant pustule, cow-pox, aphthæ, or generally ill in consequence of some process inducing ulceration or ichor, must be regarded as prejudicial to health. The possibility of milk being of a hurtful nature was suggested in all the other feverish ailments common to milk-yielding animals, as also by the different forms of in-

flammation of the udder. Again, milk which had already been drawn might become infected by immediate contact with sick persons (typhus fever, cholera, &c.), or through being kept in rooms where such persons were. Finally, through being carried in unsuitable (metal) vessels, injurious substances might find their way into the milk.—Dr. VACHER (Birkenhead) said that England had paid more attention to milk than meat, though there was still much to be done. But medical officers, if they applied the powers given them by the local sanitary authority, the Contagious Diseases Acts, and the Food and Drugs Acts, could do a great deal. In his own district they had a register of milk shops and dairies, and the milk was periodically examined. He endeavoured to prevent the sale of milk which had been skimmed and watered, which was infected with bacteria (blue or red milk), which came from animals with foot-and-mouth disease or tuberculosis, or which was infected with human disease (scarlet or typhoid fever). He advocated registration and licensing of farms, dairies, and shops, and an efficient inspection by medical and veterinary officers.—Professor BROWN alluded to the sources of contamination of milk, and he mentioned that he had isolated organisms from perfectly healthy milk. There were a large number of towns in which there were no regulations at all, or no attempts made to enforce such regulations as existed. In cases of compulsory closing of a dairy, compensation to the dairyman should be allowed. Boiling of milk had long been urged as a necessity, but objections on the score of unpleasantness had often been urged.—Dr. PACCHIOTTI (Turin) said that observations made on milk and butter which had been communicated to the Veterinary Academy of Turin showed the presence of tubercle bacilli. A regulation existed at Turin which prohibited the sale of the products of diseased cows, especially if they were tuberculous.—Dr. ARMSTRONG (Newcastle) agreed as to the necessity of licensing dairy farms; he held that the milk of tuberculous cattle should be forbidden, and both tuberculous and parturient cows should be notifiable. He was of opinion that the tubercular diathesis could be conveyed by milk even if the bacilli themselves were not transmitted. He objected to recommending the boiling of milk; it was beginning at the wrong end, and was like recommending the cooking of measly meat.—Professor WALLEY saw no harm in the general use of colostrum milk from tubercular cows. It was a great mistake for children to use the milk from one cow only. He agreed that tuberculosis should be scheduled.—Dr. ROBINSON (Dover) related a case in which he thought that the milk-supply had been polluted with typhoid poison by absorption. He likewise described an outbreak of aphthous fever traced to be due to milk infection.—Dr. EDWARD SARGEANT referred to the danger of the contamination of cheese by human specific fevers. Such food substances should never be stored in the neighbourhood of sick people. Referring to the discussion which had been raised as to milk fever and parturient apoplexy, he pointed out that they were two distinct diseases. The milk from a case of milk fever, if any were secreted, should not be offered for consumption. In the case of parturient apoplexy, it was of sudden onset; there was no fever, and he had allowed the flesh of such animals to be consumed.

Mr. FRANCES VACHER, Medical Officer of Health for Birkenhead, read a paper on the inspection of meat with regard to the prevention of disease. He said that modern research had forced on the attention of the medical profession that there was no line of separation marking off the diseases of animals from those of man. A truth so obvious should have been clearly recognised long since; but, that while the conditions of health and causes of disease in man had been studied by physicians and medical officers of health, the conditions of health and causes of disease in the lower animals had been studied by veterinarians. Both studies were closely related branches of the same subject, and could be most profitably pursued together. The diseases of animals used for food and their relation to the diseases of man could nowhere be so well studied as in the public abattoir. Unfortunately in this country public abattoirs were not generally provided, and in those that existed the bulk of the interesting pathological material presented was wasted, because we had as a nation no properly organised system of meat inspection. Split carcases, dressed and cold, were viewed and passed without the viscera or any part thereof being produced, and their fitness for food was commonly decided by a nuisance inspector or market constable.—Dr. OSTERTAG (Stuttgart) described fully the systems of meat inspection at present in force at Berlin, Baden, and elsewhere in the German empire.—Professor FLEMING held that the public had a right to know that the food-supply was pure. He insisted that it was necessary for medical men to know something of comparative pathology.—Professor WALLEY urged the necessity of the establishment of a sanitary medico-veterinary board. He referred to the difficulty of discovering local tubercular deposits in some parts of beasts which were slaughtered.—Dr. ADAMS (Maidstone) said that often carcases of diseased animals were killed outside the town, and then dressed and brought in, so that it was impossible to detect the fact that the meat had come from an abnormal source. Professor BROWN referred to the difficulties of taking students to the slaughter-houses in London for the purposes of study, as they were mostly private premises, and in public abattoirs the byres were let to private persons. Registration might be easily carried out, but the licensing would be more difficult. He hoped that at least some of the recommendations proposed would be carried into effect.—Professor MACFADYEAN said that there was in Germany a system in force which was much simpler and more efficient than that proposed by Dr. Vacher.

SECTION IV.

INFANCY, CHILDHOOD, AND SCHOOL LIFE.

This Section met on Tuesday in the theatre of the London University, under the presidency of Mr. J. B. Diggle, Chairman of the London School Board.

Scientific Observation of Children in Schools.—Dr. F. WARNER read a paper on this subject. He said the scientific study of children should be grounded upon observation, and his remarks were made upon the observation of 50,000 children seen in schools. It was found convenient to employ schedules for recording observations, separating points in physiognomy and development from those due to nerve action, and among the latter a number of new signs (postures and movements) were introduced for the purposes of such inquiry. By obtaining the teacher's report on each case noted, it became possible to obtain information concerning the correlation of visible signs and mental status. The following classes of pupils were defined, their number and distribution determined by observation:—1. Children well made, with nerve system acting well, and mentally bright normal children. 2. Children well made, nerve system acting well, but dull at school work. 3. Children presenting various defects in development. 4. Children presenting abnormal nerve signs. 5. Children presenting defects in development and abnormal nerve signs. 6. Children presenting defect in development and abnormal nerve signs, also indications of low nutrition. 7. Eye cases of various kinds. 8. Deaf children. 9. Children crippled, deformed, or maimed. 10. Epileptic, feeble-minded, imbeciles. 11. Cases exceptional in mental status. 12. Children delicate and thin. The teachers generally acknowledged that the dull children in the school had been selected by observation. The greatest number of visible defects was found in boys; the nerve signs varied greatly with the methods of school training. The kind of material collected in a school, as well as the outcome of training, might be defined and to a large extent determined by observation independent of oral examination. In resident schools there were few thin children, but certain nerve conditions were very prevalent, though not equally distributed in all schools. The general outcome of the inquiry indicated the advisability of studying the pupils in two ways—(1) by mental tests, and (2) by physical examination or inspection. For the gain of direct scientific knowledge, it was desirable to note all departures from the normal types. It appeared to be a great gain to note, not only points in development and physiognomy, but also the nerve signs indicated; those postures or balances and movements or actions which were noted as signs were selected after much labour in observation, analysis, and comparison, and they seemed well suited for the purpose in hand. They were readily recognised, and could easily be taught by means of casts, diagrams, and demonstration. Physical examination by inspection was useful (1) as a means of selecting cases for special mental report, and (2) as supporting a report founded on mental tests only. The double mode of inquiry was specially

necessary to detect certain cases; the mental test alone would leave out of view those nervous children who suffer much, but are usually bright at work and interested in it, and tend to pass the standards quickly; on the other hand, grave mental defects might occur with brains good for all other functions. A hospital physician sees many children, delicate, feeble-brained, children with small heads, nervous children with headaches, chorea, occasional fits, those partially deaf and blind, conditions without a tendency to a fatal termination, and not preventing a modified and adapted education—such children need provision for their training, without it they will probably tend to failure and incapacity in after life. They should be known and specially cared for. The paper was accompanied by statistical tables dealing with the number of physically or mentally dwarfed children in schools.

Dr. SHUTTLEWORTH, in the course of the discussion which followed, referred to the energy and zeal with which Dr. Warner had carried on for three years his work of systematic observation. He moved the following resolution:—"That according to the returns prepared by Dr. Warner on the feeble-minded, epileptic, &c., it would appear that an appreciable number of children, though not imbecile, are more or less defectively developed in brain and body; that for their training and education special arrangements are necessary; and that in the absence of such arrangements there is great probability of grave moral and mental deterioration."—Mr. GRAHAM BALFOUR seconded the motion as representing the Charity Organisation Society, pointing out the great advantages gained by the analysis of feeble-mindedness suggested by Dr. Warner, by which any scientific education of such children was for the first time rendered possible. This paper seemed to mark a distinct advance in education in this country, but it was most important that the investigation should be continued to be carried on.—General MOBERLY hoped that in the efforts that were to be made to deal with the training of these mentally defective children they would be able to effect some improvement in their condition. He was exceedingly interested in Dr. Warner's paper, but greatly alarmed at the same time, for he had had no idea of the large number of children that would require to be dealt with. Dr. Warner's examination of children in schools was very general and accurate, and was supported by teachers who were greatly interested in the investigation. The London School Board proposed to establish three schools for the experimental training of the feeble-minded, and though very little was known in England of the system of training required, great encouragement was afforded by Dr. Shuttleworth's report as to its success in other countries. The physical development and cleanliness of the children were to be cared for, in the hope of enabling them to return to the ordinary schools, if not in the standards which according to age they should join, at least in some standard. The medical officer of the Board would have to examine each child before he or she was admitted into the special school, and would no doubt from time to time inquire into his or her condition to see what improvement had been made.—After some observations from Dr. Fletcher Beach and Dr. Förster (Vienna), Dr. JACOBI (New York) said there was one reason why the resolution ought to be passed, and which had not been sufficiently dwelt upon. It was desirable to advance the weak, but it was of greater importance to protect the strong and the intellectual. Whenever all classes of intellectual and non-intellectual pupils were found together in the same school, both the method of teaching and the result of the learning tended to a low average. Having the weak and the strong together, they did not benefit the former, but they harmed the latter by preventing them from realising their possibilities.—Dr. LANGDON DOWN remarked that the value of Dr. Warner's inquiry depended entirely upon the truthfulness on which his arguments were based. The basis was that there was a correlation between physical conformation and mental power. It would be interesting to Dr. Warner to know that he entered into a similar inquiry thirty years ago with regard to the physical conformation of idiots and imbeciles, and that he then wrote: "The condition of the idiot is not simply one of mental alienation; it frequently presents also grave physical deterioration, and this physical deterioration is as much a test of idiocy as is the low condition of mental power." Subsequently, he had been accustomed to investigate the physical and mental condition of children who had slightly feeble power with results confirmatory of the results of Dr. Warner's inquiries. While thanking Dr. Warner for his statistics, he was of opinion that the inquiry should be much more extensive and over more varied fields.—Dr. RHODES had pleasure in supporting the resolution, and held that the inquiry should be extended to all England, to ascertain the real number of feeble-minded children. Four years ago he had occasion to estimate the number of feeble-minded children in the north of England, and the result was that he found that not above one in five was returned in the census schedules, even if idiotic. This was a question which would have to be faced, and it was not to the credit of England that we had allowed France to advance faster than ourselves. At the present time there was a Bill before the Chambers to compel every department to provide two establishments—one for epileptic and one for non-epileptic idiots.—Mr. J. PEAKE RICKARDS (Hanwell Asylum) maintained that a more thorough examination of children ought to be made, and that it should be compulsory for every child on entering a school, whether Board School, middle-class, or upper-class school, to be examined by a medical officer, and the result of the examination to be recorded. It would be almost impossible to thoroughly examine all children now in schools, but legislation should in future make it compulsory, as was now done with recruits entering the army. Slightly imbecile children of the lower classes, if properly taken in hand during school life, would tend to lessen considerably the number of admissions into the county lunatic asylums, and this work would not only be of considerable advantage to the welfare of the State in general, but to the ratepayers in particular.—Mr. NOBLE SMITH thought some practical deductions ought to be drawn from the valuable statistics prepared by Dr. Warner. The popular idea was that it did not so much matter that the children should be deficient in at least physical development or deformity, because they would most probably, if not certainly, "grow out" of their deficiencies. This idea was not in accordance with medical experience. To elucidate this point, he had observed large numbers of artisans, and he had found out of batches of these adults that nearly as many possessed some crookedness of limbs as there were straight-limbed men. He urged that more attention should be devoted to improving the nutrition of children and modifying their work, physical as well as mental. The resolution was adopted.

Hygiene of School Life and Law in relation to the Children.—A group of papers having reference to this subject was next taken.—Dr. OCTAVIUS STURGES read a paper on Physical Indications of Injurious Schooling, his object being to direct the attention of school teachers to nervous disorder in children, and especially in girls, due to circumstances of school life, such as overwork, punishment, the excitement of examinations, harsh treatment, and so forth, and to suggest a few simple rules for the detection of such disorder. Some examples were quoted in illustration of the modes of origin, development, and progress of St. Vitus's dance in children. The restlessness, over-movement, and inattention due to waywardness, temper, insufficient food, and other causes, were contrasted with the similar symptoms of St. Vitus's dance, and it was shown how intelligent observation would enable any teacher to separate infallibly the one from the other. Finally, some characteristics of St. Vitus's dance were described and illustrated by examples, and some simple tests were mentioned for the discovery of St. Vitus's dance in school children at its commencement.—Mr. MALCOLM MORRIS, F.R.C.S. (London), read a paper on Ringworm in Elementary Schools. This paper is printed on another page.

Dr. C. E. SHELLY, medical officer to Haileybury, read a paper on Epidemics in Schools. Such epidemics (the school premises being, as they always should be, healthy) originated outside the school. Special facilities existed for this infection from without, and day schools were specially open to infection from without. Individual protection was thus more frequently attained; and epidemics, though more common, were less extensive. The attendance of day scholars increased the risk and frequency, and somewhat diminished the extent, of epidemics in boarding schools. Boarding schools were more isolated communities. Epidemics were relatively infrequent, and consequently more extensive. The establishment and spread of an epidemic were favoured by the aggregation of susceptible material and the attainment of the "explosive ratio." When the number of unprotected reached a certain proportion of the total scholars,

an epidemic outbreak might be expected with certainty. This ratio varied with the disease: for measles, for example, in large boarding schools entered at about thirteen years of age it was about one-third; and the number attacked in a full outbreak would be about three-sevenths of the unprotected—i.e., one-seventh of the whole school. The influence of this explosive ratio explained the tendency of epidemics to recur at approximately regular intervals of time. As checks to the introduction of infection he recommended an efficient health certificate system and enforcement of efficient quarantine and disinfection after exposure. The checks to the spread of the epidemic were: early notification of illness, early and effective isolation and disinfection of patients, presence of day scholars; separate masters' "houses"; and subdivision of the school into a senior and junior establishment. Dr. Shelley then dealt with the subject of the mutual relationship and influence between different epidemic diseases, instancing measles and whooping-cough, rötheln and measles and scarlatina, scarlatina and diphtheria, mumps with measles or with rötheln, vaccination (or small-pox) and typhoid fever. He also referred to the influence of seasons and to the importance and value of systematic records of disease in schools.

Very little discussion took place on this group of papers.

Handwriting as taught in Schools in relation to Hygiene.—Papers on this subject were read by Dr. KOTELMANN (Hamburg) and Mr. J. JACKSON, with the view of showing that the teaching of children in "sloped" handwriting is physically injurious. The following resolution was moved: "That as the hygienic advantages of vertical writing have been clearly demonstrated and established both by medical investigation and practical experiment, and that as by its adoption the injurious postures so productive of spinal curvature and short sight are entirely avoided, it is hereby recommended that upright penmanship be introduced and generally taught in our elementary and secondary schools."—Mr. NOBLE SMITH said his attention was drawn some years ago to the fact that children obtained a bad physical attitude more from being taught to slope in handwriting than from any fault in the shape of the seat or writing desk. He demurred, however, to the word "entirely" in the resolution, and moved to substitute for it "to a very great extent."—Professor GLADSTONE seconded the amendment, which was opposed by Mr. KREVIL, and, on being put to the vote, the amendment was carried and adopted as the substantive motion.

Employment of Children in the United States.—Dr. JACOBI of New York read a paper on the Laws regulating the Employment of Children in the United States of America. He referred to the progress that had been made in regard to limiting the age of children employed in factories, insisting upon compulsory education both in the United States and Canada. Most of the States did not permit children to work in factories unless they could pass a definite educational standard. He claimed at the same time that while American legislation was based upon English legislation, particularly as established by the Consolidated Factory Laws of 1878, it was in advance in extending the age at which children were allowed to work in factories.

Burial Societies and Infant Life Insurance.—A paper by Mr. C. E. PAGET, M.R.C.S., Medical Officer of Health for Salford, was read, on an Objectionable Feature of some Burial Societies in their relation to Infant Life Insurance. The inquiry into the subject of the paper, said the author, came about in consequence of an investigation into the high infantile mortality which is so common, and depends on so many causes, in large towns, and especially in large manufacturing towns. The author recognised the difficulty of discriminating between such causes as hereditary predisposition, food, want of cleanliness, of air, soil, and water, and seasonal diseases, and also the difficulty of defining infant insurance as a predisposing cause of infant mortality. The greater number of such insurances in towns than in country districts was assumed in general terms, and the author was of opinion that it could not be shown that infant insurance was frequently a cause of infant mortality. But the object of the paper was to draw very prominent attention to certain features in the conduct of some burial and friendly societies, which must be considered to be very reprehensible, and certainly were most objectionable. The circumstances of the societies referred to in the paper were such as to make it possible for the claimants for burial moneys to be seriously exposed to the temptation to take alcoholic drink, the payment for which must be made out of the burial moneys. The societies met at public houses; the treasurers were the hosts or hostesses of the houses where the societies met; and, as the treasurers were not paid for their services out of the funds of the societies, as were the other chief officers, a certain portion of the burial claims was paid in liquor from the houses, or, if the claimants elected not to take liquor from the houses, then a contribution out of their burial moneys must be left in the hands of the treasurers as payment for services. Mr. Paget urged that, in any serious measure for the regulation of infant life insurance, the Legislature should provide—(1) That every mutual insurance society should be registered; (2) that no such society should be permitted to meet in any place in which the payment of wages is forbidden under the Truck Act; (3) that no chief officer of such a society should have a direct interest in the office of the society; (4) that all the chief officers, if remunerated for their services, should be paid out of the funds of the society; and (5) that no deduction whatever be permitted from the burial or insurance claims by any officer of the society for any purpose whatever.

The Section adjourned at 2 P.M.

WEDNESDAY.

At the second day's sitting of Section IV. the President, Mr. J. R. Diggle, read the presidential address. At the commencement of the business, however, a communication was read from the Hull School Board with reference to the subjects proposed to be discussed at this conference, and enclosing a resolution unanimously adopted by that School Board, to the effect that while the sanitation of public elementary schools had been much improved, a large number of private adventure schools existed in which bad sanitation prevailed, and rendered it desirable that steps should be taken by the Congress with the view of placing such schools under some efficient system of inspection.

The PRESIDENT then delivered an address, in which he dealt with the question of education. In the course of his remarks he laid great stress on the due appreciation of the value of the material with which educationists have to work, and continued: "Whatever may be the outcome of the future, it is clear that some sort of State interference is a necessity for the present. The exigencies of our modern civilisation, not less in our crowded cities than in our thinly peopled villages, invite the intervention of the State in the interests of the general community. The influence of law surrounds and presses upon us like a social atmosphere. Our main business is to take due precautions that the intervention of the State where it occurs shall proceed upon right lines and in directions where experience indicates that success will attend upon it. Thus the healthiness of the school-room, the suitability of its arrangements and of its surroundings for the purposes of a school, its appointments for the purposes of teaching, are all matters of vital importance to the whole of the community who make use of it. In what manner these things can best be secured the papers and discussions of this Congress may help to point out with clearness and fulness. Again, the entire range of the teaching which is intended for the development of the whole child concerns the community still more than the general suitability of school-rooms as places where teaching is given. At times there has been a tendency to make the range of teaching coincide too much with the knowledge of books and too little with the experience of natural things. The culture of physical powers has been neglected, with a consequent loss of physical strength and of graceful bearing. Too much learning from books apart from the things themselves has led to a weakening of the faculty of observation, and to a loss of the aptitude for independent reasoning from observation and experience combined. Too little care for the spiritual capacity of the child has blunted the moral perception and retarded perfect intellectual development. Stunted or perverted ideas upon these cardinal principles, when they take the form of State laws, can only be administered at the loss of the community. From our deliberations here, where the widest freedom of utterance prevails, it is no small consolation to think that many will strike the one note which may harmonise many discords when insisting that the importance of developing the entire physical, intellectual, and spiritual capacities of chi'dren far transcends the minor matters which create divisions amongst us.

An Experiment concerning Over pressure.—Professor LEO BERGERSTEIN (Vienna) read an elaborate and interesting paper describing an experiment carried on with the view of ascertaining how far the brain power of school children is affected in the course of a working hour. The experiment was carried over several schools, care being taken to have the same subjects in similar arithmetic at the various schools, and to make each successive ten minutes' work as similar to its predecessor in the demand made upon brain power as possible. The result was to show that power of work rises and falls during the time of the ordinary lesson, and the general conclusions arrived at by Professor Bergerstein were as follows, and were formulated by him in a resolution which he formally moved:—1. It is desirable that the question of mental overpressure should be studied by exact experimental methods, and that school authorities should instigate experiments in that direction. 2. Until the question of overpressure has been thoroughly investigated by scientific methods, no school lesson should last longer than three-quarters of an hour, followed by a quarter of an hour's rest.

School Hygiene in Belgium.—A paper on school hygiene in Belgium was next read by Professor H. KUBORN, in which it was pointed out that during recent years the advances made in Belgium in the matter of school hygiene had exerted a most favourable and remarkable influence, especially as regards the physique, the vision, the general health, and the cerebral development of school children. Professor Kuborn concluded by seconding the resolution of Professor Bergerstein.

Laws regulating Child-growth.—W. ARBUTHNOT LANE, M.D., Assistant Surgeon to Guy's Hospital, read a paper on some of the laws which regulate the growth of the child. He deemed it a matter of the greatest importance that those who have to do with the education of children should render themselves familiar with the mechanisms of the several skeletal arrangements of the human body and with their physiology, especially during the varying movements of activity and attitudes of rest. This portion of the study of anatomy—namely, its physiology—had, he said, unfortunately received but scanty attention from anatomists, and much of what little was stated upon the subject in standard works was too often incorrect and misleading. He pointed out that the form of any particular joint or combination of joints, is evolved from, and depends for its continued existence on, what is called a normal condition, upon a combination of movements of activity with attitudes of rest, and that if this combination is departed from the joint or joints undergo very definite anatomical changes in consequence. Mr. Lane then discussed fully the several laws which governed the development of the conditions of health and the hereditary influence they exerted.

A discussion took place on the above papers.—Dr. GLADSTONE expressed the satisfaction of educationists that experiments such as had been described had been made, and trusted that the preliminary inquiries of Professor Bergerstein would be continued, in order to ascertain what was the length of time best fitted to give good results in children's lessons. Meantime, he agreed in the conclusion arrived at that the length of the lesson should not exceed three-quarters of an hour.—M. FÉRAT exhibited forms of school furniture, fitted with simple mechanical contrivances to make each seat or desk the proper height for children of different years.—After a few words from Dr. KOTELMANN, the resolution was carried.

Physical Education of Children (illustrated).—Mr. G. WHITE, chairman of the Committee on Physical Education of the London School Board, read a paper on physical education. Greater interest and attraction obtained to the paper by the presence of a band of twenty-four school-girls, from Montem-street Board School, to go through certain simple gymnastic exercises illustrative of Mr. White's observations. The girls were dressed in a neat semi-uniform, and went through drill to the word of command of Miss Allison, assistant mistress of Montem-street School, the scholars of which won the banner for physical exercise two years ago. Mr. White said that physical education being partly to secure the best conditions for mental effort by promoting the best physical conditions, it included such instruction as led to uniform and harmonious development of the whole body of the individual child; but it did not include such specific or extraordinary exercise and education as led to the mighty physique of the professional athlete. Its limits, therefore, with respect to the school, and the conditions for its healthy prosecution, could be easily defined and formulated. The physical exercises of gymnastics suitable for the school are of course different from those practicable for the period of adolescence or for the adult. Exercises with apparatus more or less involve severe strain, and this severe muscular effort may seriously affect the development of the young subject, and may lead in some cases to the ossification of the epiphyses. On many other grounds, too many to be here given and explained, the use of apparatus by children at school is to be deprecated, the aim with regard to them being "not at localising the muscular effort over a limited region, but, on the contrary, to generalise it by distributing it over a large number of muscles at the same time—not to induce fatigue quickly, but rather to bring all the functions into greater activity." Mr. White then advocated swimming as one of the subjects of elementary education. No school could be said to have its educational machinery complete unless it includes in it ample accommodation for the teaching of all its children how to swim, and the London School Board had lately recognised this by resolving, wherever proper public bath accommodation available for the purpose of instruction in swimming was not provided, to build in its new schools swimming baths, in order that all the boys and girls attending its schools might have their education complete in this particular. (Applause.)

Dr. BROMAN (London) read a paper on Physical Exercise in the School, in which he insisted on the necessity for regulated physical exercises, and enlarged on the true aim of physical education.

In the course of a discussion, the Earl of MEATH said he had recognised for some time that children in large cities required physical training, and he expressed keen satisfaction at the work being done by the London School Board in this direction, whose example he trusted would be followed generally by School Boards throughout the country. He had shown his feeling in the matter by twice introducing a Bill in the House of Lords barring from the higher education grants such School Boards as did not pay sufficient attention to the question of physical exercise.—Mr. NOBLE SMITH would like to see all "out of school" work abolished—(applause)—so that the child should have ample opportunity for recreation, and he strongly supported physical training, not to take the place of play time in school hours, but as one of the subjects of tuition. He formulated his ideas in four resolutions as follows: (1) That all out-of-school work ought to be abolished; (2) that ample physical recreation ought to be carried out; (3) that long walks are undesirable; and (4) that in the intervals of exercise the body should be properly rested.—After observations from Dr. W. BROWN (New Zealand) and Professor F. C. ROBINSON (Maine, U.S.A.), Sir P. MAGNUS (London) objected to the first resolution, unless it was qualified. On being put, the feeling of the meeting was in favour of a resolution "that the hours for home work be restricted." The second of Mr. Noble Smith's resolutions was adopted, the third was lost, and the fourth carried.

The Value of Hygiene to Women.—Dr. A. T. SCHOFIELD (National Health Society) read a paper on the value of hygiene to women. Hygiene, or the laws of health, remained the most neglected of subjects, yet it was peculiarly adapted for women in all relations of life. He moved as a resolution, "That this Congress warmly advocates the instruction of girls and women in personal and domestic hygiene as an integral part of their education." The resolution was carried.

Manual Training in its relation to Health.—A paper on the above subject was read by Sir PHILIP MAGNUS, in which he pointed out that manual training serves to exercise organs which call into action brain centres at the very time when such centres need development, and it thus conduces to the more effectual development of the brain itself, and to the consequent increased health of the whole body. Experience has shown that manual training, whilst withdrawing time from literary pursuits, does not retard the child's progress in these pursuits. The alternation of sedentary with active lessons quickens the child's vitality, and so tends to stimulate the interest in ordinary studies, and to increase the general cheerfulness. As compared with drill, and physical exercise, and open-air games, manual training, looked at from the physical side, would occupy a secondary place. But as a substitute for a part of the ordinary book lessons, it is found that besides having a distinct intellectual value as a school discipline, and also an

industrial and economic value, it conduces to the development of the brain and muscle of the child, and to the maintenance of a healthy condition of mind and body.

The last paper read at this sitting was one by Dr. DESHAYES (Rouen) on the Hygiene of the New-born Child. The business of the Section was then adjourned at 2 o'clock till the following morning.

THURSDAY.

The first of the three groups of papers with which the members of the Congress in Section 4 busied themselves on Thursday dealt with the social problems connected with neglected children, the effects of education on criminality and mental diseases, and the State methods of treating juvenile delinquencies. Papers on these subjects were read by Mr. W. MITCHELL, Vice-Chairman of the Glasgow School Board; Dr. KUBORN, of Seraing-Liège, and Colonel PRENDERGAST, Chairman of the London School Board Industrial Schools Committee. Having described the development of Reformatories and Industrial Schools in this country, Colonel Prendergast said that these schools in all their varieties had been working most beneficially for the last few years. It took time to build them up, but their influence had been really felt, and they would have a still greater share of success if the community at large would take a greater interest in their development and results, and help the managers to place out the children in situations when they were ready for service.

In the course of the discussion which ensued, Miss DAVENPORT HILL pointed out the dangers of removing the responsibility from parents for the care of their children. That should only be done when there was nothing else to be done, for by giving free dinners, medical help, and so on, her experience taught her that they only induced parents to neglect their duties all the more.—During the sitting Dr. OCTAVIUS STURGES, who had read a paper on Chorea at the Tuesday sitting, showed three little school patients to demonstrate a simple experiment by which school teachers might tell whether fretful and backward scholars were not suffering from the beginnings of the disease. The experiment consisted in getting the pupil to hold up both hands, which, in the case of incipient disease, the child was unable to do without a perceptible quivering. Among the papers read at the sitting was one from the Rev. J. Llewellyn Davis on Free dinners for School Children.—Mrs. BESANT also discussed the question whether hungry and half-clothed children can be efficiently educated. Mrs. Besant moved the following resolution, "That this Congress, asserting the duty of the State towards its future citizens in the matter of education, declares that the feeding and clothing of destitute children is necessary for their efficient education." On the motion of Mr. Berwick it was agreed to amend the resolution affirming the necessity of feeding and clothing destitute and neglected children by adding, "and that where such destitution or neglect is due to the misconduct of the parent or guardian it is the duty of the legislature to visit that misconduct with penal consequences." The motion as amended was carried.

SECTION V.

CHEMISTRY AND PHYSICS IN RELATION TO HYGIENE.

Sir HENRY ROSCOE, M.P., F.R.S., LL.D., D.C.L., in his address as the President of this Section, said that the branch of the great subject of hygiene with which they had to deal—viz., that of the relation in which it stands to the sciences of chemistry and physics—was one of primary importance and interest. Indeed, taken in its most general sense, the relation of the science of health to chemistry and physics would, he held, be found to include almost all the varied subjects which came under the cognisance of the Congress, for all vital processes were regulated by chemical and physical laws, and physiology might be defined as the chemistry and physics of the animal body. Hence the preservation of a normal condition, or of health, being dependent upon these laws, it was clear that the Section of Chemistry and Physics was the most important of all, for it was by obeying chemical and physical laws that health was maintained. But whilst chemists and physicists might claim credit for laying the foundations of the edifice of hygienic science, they were glad to admit that portions of the building had been raised by other hands, and heartily did they welcome the successful efforts which the biologist, the physician, the engineer, and the statesman had made to help them to complete the building up of a condition of things by which the amount of preventable disease was reduced to its possible minimum, and that of health and well-being increased to the maximum possible under the necessary circumstances of our lives. Sir Henry, referring to the progress which during the last half-century had been made towards the attainment of this end, said:—"He who runs may read. Fifty years ago our notions of the nature of contagion, of the causes which lead to the spread of epidemic diseases, were of the crudest and vaguest description. In those days 'pump' water was believed to be wholesome if only it was cool and sparkling, and water from a source now recognised as dangerously impure was preferred to the pure article which came from a distance in the city mains. Now the sanitary authority closes all doubtful wells, and municipalities incur vast expense in bringing home to everyone a pure supply of this necessity of life. That fifty years since our knowledge of these matters was limited is due to the fact that in those days chemists were unable to decide whether a water was harmless or dangerous. The methods of analysis were then crude and insufficient; and even now, when these methods have been greatly improved, the most expert analysts may find themselves in disagreement, on a mere chemical examination, as to whether a given water is fit to drink or not." In alluding to the important subject of air pollution, Sir Henry cited the instance of the House of Commons, where a system of air filtration has been successfully adopted, by which the air of the debating chamber has been preserved perfectly free from fog as well as from microbic life, if the doors are kept closed. With reference to town fogs and their prevention, he held that a scientific inquiry, if it does not at once succeed in finding a cure for the evil, may at least point the way to prevention, and it would surprise him if it is not found that the ultimate panacea will consist in using gaseous fuel and the electric light. Much, doubtless, could be done in preventing the output of smoke from factories and other places in which large quantities of coal are burnt; but, after all, the smoky atmosphere of towns was caused, he contended, chiefly by the thousands of domestic fires, and at once to alter these so as to prevent smoke, or to insist upon gaseous fuel being generally used instead of coal, was to expect the impossible. Touching on the subject of micro-organisms in their relation to disease, he held that it would be admitted by all that whilst the determination of the morphological characters of micro-organic life was an essential preliminary, it was to the examination of the life functions of the organism, and especially to those connected with the production of its peculiar chemical poison, that we must look for the complete solution of the problem; and therefore it was in the laboratory of the chemist, and by the application of chemical and physical methods of research, that progress in these matters would in the coming time be made. So again, he maintained, the foundations of hygienic progress are to be sought in the application of the principles of chemistry and physics. In conclusion, Sir Henry said he knew that all well-wishers to this progress, whether English members or the foreign guests who had honoured the Congress by their presence, would rejoice to learn that Englishmen, having determined no longer to lag behind their Continental friends, were about to establish a National Institute of Preventive Medicine, in which not only researches of the kind alluded to could be satisfactorily carried out, but where instruction in the numerous special branches of science, upon which the health of the nation depends, could be given. Finally, he added, the pecuniary support necessary for carrying on the work of the institute must come wholly from private sources: for the Government, unlike that of many countries, as yet held aloof from supporting institutes of this kind, however necessary they might be to the general well-being of the country. The time might not be far distant when different views would prevail, and when Parliament considered it one of its first and most binding duties to support by imperial grant an institution whose sole aim was that of increasing knowledge of the conditions upon which the health of the nation ultimately depends, and of diffusing that knowledge widely throughout the land.

Town Fogs and their Effects.—Dr. W. J. RUSSELL, in one of the ablest papers that have appeared on this important subject, drew the attention of the Congress to the circumstances which lead to the formation of

An Experiment concerning Over-pressure.—Professor LEO BERGERSTEIN (Vienna) read an elaborate and interesting paper describing an experiment carried on with the view of ascertaining how far the brain power of school children is affected in the course of a working hour. The experiment was carried over several schools, care being taken to have the same subjects in similar arithmetic at the various schools, and to make each successive ten minutes' work as similar to its predecessor in the demand made upon brain power as possible. The result was to show that power of work rises and falls during the time of the ordinary lesson, and the general conclusions arrived at by Professor Bergerstein were as follows, and were formulated by him in a resolution which he formally moved:—1. It is desirable that the question of mental overpressure should be studied by exact experimental methods, and that school authorities should instigate experiments in that direction. 2. Until the question of overpressure has been thoroughly investigated by scientific methods, no school lesson should last longer than three-quarters of an hour, followed by a quarter of an hour's rest.

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THURSDAY.

The first of the three groups of papers with which the members of the Congress in Section 4 busied themselves on Thursday dealt with the social problems connected with neglected children, the effects of education on criminality and mental diseases, and the State methods of treating juvenile delinquencies. Papers on these subjects were read by Mr. W. MITCHELL, Vice-Chairman of the Glasgow School Board; Dr. KUBORN, of Seraing-Liège, and Colonel PRENDERGAST, Chairman of the London School Board Industrial Schools Committee. Having described the development of Reformatories and Industrial Schools in this country, Colonel Prendergast said that these schools in all their varieties had been working most beneficially for the last few years. It took time to build them up, but their influence had been really felt, and they would have a still greater share of success if the community at large would take a greater interest in their development and results, and help the managers to place out the children in situations when they were ready for service.

In the course of the discussion which ensued, Miss DAVENPORT HILL pointed out the dangers of removing the responsibility from parents for the care of their children. That should only be done when there was nothing else to be done, for by giving free dinners, medical help, and so on, her experience taught her that they only induced parents to neglect their duties all the more.—During the sitting Dr. OCTAVIUS STURGES, who had read a paper on Chorea at the Tuesday sitting, showed three little school patients to demonstrate a simple experiment by which school teachers might tell whether fretful and backward scholars were not suffering from the beginnings of the disease. The experiment consisted in getting the pupil to hold up both hands, which, in the case of incipient disease, the child was unable to do without a perceptible quivering. Among the papers read at the sitting was one from the Rev. J. Llewellyn Davis on Free dinners for School Children.—Mrs. BESANT also discussed the question whether hungry and half-clothed children can be efficiently educated. Mrs. Besant moved the following resolution, "That this Congress, asserting the duty of the State towards its future citizens in the matter of education, declares that the feeding and clothing of destitute children is necessary for their efficient education." On the motion of Mr. Berwick it was agreed to amend the resolution affirming the necessity of feeding and clothing destitute and neglected children by adding, "and that where such destitution or neglect is due to the misconduct of the parent or guardian it is the duty of the legislature to visit that misconduct with penal consequences." The motion as amended was carried.

SECTION V.

CHEMISTRY AND PHYSICS IN RELATION TO HYGIENE.

Sir HENRY ROSCOE, M.P., F.R.S., LL.D., D.C.L., in his address as the President of this Section, said that the branch of the great subject of hygiene with which they had to deal—viz., that of the relation in which it stands to the sciences of chemistry and physics—was one of primary importance and interest. Indeed, taken in its most general sense, the relation of the science of health to chemistry and physics would, he held, be found to include almost all the varied subjects which came under the cognisance of the Congress, for all vital processes were regulated by chemical and physical laws, and physiology might be defined as the chemistry and physics of the animal body. Hence the preservation of a normal condition, or of health, being dependent upon these laws, it was clear that the Section of Chemistry and Physics was the most important of all, for it was by obeying chemical and physical laws that health was maintained. But whilst chemists and physicists might claim credit for laying the foundations of the edifice of hygienic science, they were glad to admit that portions of the building had been raised by other hands, and heartily did they welcome the successful efforts which the biologist, the physician, the engineer, and the statesman had made to help them to complete the building up of a condition of things by which the amount of preventable disease was reduced to its possible minimum, and that of health and well-being increased to the maximum possible under the necessary circumstances of our lives. Sir Henry, referring to the progress which during the last half-century had been made towards the attainment of this end, said:—"He who runs may read. Fifty years ago our notions of the nature of contagion, of the causes which lead to the spread of epidemic diseases, were of the crudest and vaguest description. In those days 'pump' water was believed to be wholesome if only it was cool and sparkling, and water from a source now recognised as dangerously impure was preferred to the pure article which came from a distance in the city mains. Now the sanitary authority closes all doubtful wells, and municipalities incur vast expense in bringing home to everyone a pure supply of this necessity of life. That fifty years since our knowledge of these matters was limited is due to the fact that in those days chemists were unable to decide whether a water was harmless or dangerous. The methods of analysis were then crude and insufficient; and even now, when these methods have been greatly improved, the most expert analysts may find themselves in disagreement, on a mere chemical examination, as to whether a given water is fit to drink or not." In alluding to the important subject of air pollution, Sir Henry cited the instance of the House of Commons, where a system of air filtration has been successfully adopted, by which the air of the debating chamber has been preserved perfectly free from fog as well as from microbic life, if the doors are kept closed. With reference to town fogs and their prevention, he held that a scientific inquiry, if it does not at once succeed in finding a cure for the evil, may at least point the way to prevention, and it would surprise him if it is not found that the ultimate panacea will consist in using gaseous fuel and the electric light. Much, doubtless, could be done in preventing the output of smoke from factories and other places in which large quantities of coal are burnt; but, after all, the smoky atmosphere of towns was caused, he contended, chiefly by the thousands of domestic fires, and at once to alter these so as to prevent smoke, or to insist upon gaseous fuel being generally used instead of coal, was to expect the impossible. Touching on the subject of micro-organisms in their relation to disease, he held that it would be admitted by all that whilst the determination of the morphological characters of micro-organic life was an essential preliminary, it was to the examination of the life functions of the organism, and especially to those connected with the production of its peculiar chemical poison, that we must look for the complete solution of the problem; and therefore it was in the laboratory of the chemist, and by the application of chemic l and physical methods of research, that progress in these matters would in the coming time be made. So again, he maintained, the foundations of hygienic progress are to be sought in the application of the principles of chemistry and physics. In conclusion, Sir Henry said he knew that all well-wishers to this progress, whether English members or the foreign guests who had honoured the Congress by their presence, would rejoice to learn that Englishmen, having determined no longer to lag behind their Continental friends, were about to establish a National Institute of Preventive Medicine, in which not only researches of the kind alluded to could be satisfactorily carried out, but where instruction in the numerous special branches of science, upon which the health of the nation depends, could be given. Finally, he added, the pecuniary support necessary for carrying on the work of the institute must come wholly from private sources: for the Government, unlike that of many countries, as yet held aloof from supporting institutes of this kind, however necessary they might be to the general well-being of the country. The time might not be far distant when different views would prevail, and when Parliament considered it one of its first and most binding duties to support by imperial grant an institution whose sole aim was that of increasing knowledge of the conditions upon which the health of the nation ultimately depends, and of diffusing that knowledge widely throughout the land.

Town Fogs and their Effects.—Dr. W. J. RUSSELL, in one of the ablest papers that have appeared on this important subject, drew the attention of the Congress to the circumstances which lead to the formation of

fogs. Dust particles were necessary, he said, for their production. Aitken's experiments on dusty and dust-free air showed this. Some idea of the smallness of the amount of matter capable of determining the formation of fog could be gained from the fact that in certain experiments $\frac{1}{10}$th of a grain of iron or $\frac{1}{200}$th of a grain of copper had been known to produce condensation enough to exhibit all the characteristic appearance of fog. Products of combustion dust, as the result of constant traffic in the streets, were capable of acting as fog producers. Fogs occur in most cases immediately after a fall in the barometer, and the persistence of fogs above the dew point depended on a maintenance of high pressure. The impurities in the air of towns were absorbed by fogs. They were found to be sulphuric acid, sulphurous acid, and organic matter. A fog deposit collected at Kew consisted of 42·5 per cent. carbon, 4·8 per cent. hydro-carbons and organic bases (pyridines), 4 per cent. sulphuric acid, 0·8 per cent. hydrochloric acid, 1·1 per cent. ammonia, 41·5 per cent. mineral matter, and 5·3 per cent. moisture. That collected in Chelsea consisted of 39 per cent. carbon, 12·3 per cent. hydrocarbons, 2 per cent. bases (pyridines), 4·3 per cent. sulphuric acid, 1·4 per cent. hydrochloric acid, 1·4 per cent. ammonia, 2·6 per cent. iron and magnetic oxide; mineral matter, 31·2 per cent.; moisture, 5·8 per cent. The amount of deposit collected was equivalent to six tons to the square mile. Evidence of the increase of fogs in London was furnished by the returns of the Meteorological Office. Some years back the number of fogs in a given time in London was 93, later 119, then 131; while recently, in the same period, it was 156. Very interesting details were entered into relative to the increased consumption of coal through the want of increased supply of gas for lighting purposes. Dr. Russell, from a consideration of the death-rate returns, regarded the high rates of mortality during fog to be due to the fall of temperature which almost always precedes fogs, rather than to the effect of the fog itself. The experiments of Professor Dyer showed conclusively the deleterious effects of fog on plants, the toxic influence being attributed to the sulphurous acid. If fogs continued to increase, Professor Dyer feared that horticulture would soon be impossible in the vicinity of London. The great power which fogs exercise of absorbing light, and their special power of absorbing the more refrangible rays, were next alluded to. There could not be the least doubt that a great amount of harm from fogs resulted from the absorption of active rays of light. The chemical activity of the sun's rays in conducing to a healthy atmosphere was greater than was supposed. The amount of sunshine in London was then compared with that in the neighbourhood and in other places; in many instances this difference was enormous. The paper concluded with a discussion of the questions whether fogs can be abolished from towns, and whether, if not abolished, they can be rendered free from foreign matters. As long as coal was used for domestic fires, which were the chief offenders, fog would not be got rid of, and this conclusion suggested the substitution for coal of gaseous fuel.

Before discussion was invited on Dr. Russell's paper an interesting article on the Air of Large Towns, and the methods of its analysis, was next appropriately read by Mr. HARTOG on behalf of the Town Gardening Section of the Manchester Field Naturalists' Society. In this paper figures were quoted giving the amount of sulphur acid condensed on snow while falling through a dense fog in Manchester, the amount varying from 10 to 31 milligrammes per square centimetre, while at three miles distant it varied from 4·3 to 7·5 milligrammes. It was a significant fact that, whereas in the centre of London certain plants thrived fairly well, they could not be made to grow at all in Manchester—a fact which might receive explanation from the large difference in the amount of sulphur acids existing between the provincial town and the metropolis. The methods of analysis were described, and the mode of estimating the organic matter in the air that was adopted was explained.

In the discussion which then ensued, Mr. E. HART said that it would be well to remove the popular notion that existed that, after all, fog was not the evil many imagined it to be. Indeed, some held it as of distinct antiseptic value, inasmuch as it contained minute quantities of creasote derived from the products of combustion. He did not think that the lowering of temperature referred to by Dr. Russell would account for a high rate of mortality, and he was strongly inclined to believe that the active properties of the sun's rays, which were practically stopped by fog, had a great deal to do with purifying the atmosphere. In conclusion, he urged the members of the Congress to agitate for legislation on this vitally important subject.—Professor OLIVER, of the Horticultural Society, followed, and gave a most interesting account of fog on plant life. Some admirable water-colour drawings illustrated strikingly the injury caused by fogs. It was impossible, he said, to produce flowers in foggy weather. He attributed the action to sulphurous acid, and in experiments he had instituted, in which an atmosphere containing a minute quantity of sulphurous acid was employed, the changes in the tissue of the plant were observed with the microscope to be the same as those produced by fog. The protoplasm swelled up, became inert, and practically dead. Professor Oliver pointed out that, according to chemical analysis, fog deposit contained a notable quantity of iron, and he suggested that the discolouration of leaves might be due to contact of this iron with the termini of the leaf. Experiments were in progress at the Horticultural Society's gardens in Chiswick with the view of ascertaining the effect of employing filtered air and the electric light.—Mr. TEALE, after observing that the high rate of mortality could not in his opinion be assigned to fall in temperature, but rather to fog, as might be gathered from the statistics on Dr. Russell's charts which were hanging on the walls, expressed his views regarding the conditions necessary for the perfect combustion of fuel. Attacking the system of open grates, which he held to be the cause not only of the smoke nuisance, but also of enormous fuel waste, he advocated the use of fire-bricks, so that the temperature necessary for the combustion of the distilled products should be maintained. He held that contact with air should take place only at the top of the fire, and not at the bottom. This would avoid the cooling of the fuel and consequent separation of unburnt products. [These views are in accordance with those put forward by THE LANCET Commission some time ago when investigating the stove invented by M. Claussen, who demonstrated the truth of these principles which were then laid down.] After some remarks made by a few of the foreign members, who were chiefly concerned about the effect of fog and smoke on fine statuary, it was moved by Sir HENRY ROSCOE, and seconded by Mr. HART, "that the section of chemistry and physics in relation to hygiene requests the President of the Local Government Board to take into consideration whether legislative measures cannot be introduced to lessen the amount of smoke produced from dwelling-houses, and thus to diminish the intensity and mitigate the evil effects of town fogs." Put to the meeting, the motion was declared carried unanimously. After the exhibition of an ingenious but somewhat complicated apparatus by Mr. Sheridan Délépine, demonstrating the possibility of removing the smoke of fires from the air of towns and of using it for disinfecting purposes, the proceedings terminated.

WEDNESDAY.

On Wednesday the first paper down for reading in this Section was one by Dr. Dupré, who, however, as it subsequently transpired, was unable to be present through ill-health. The President thereupon called upon Dr. THRESH to read his paper, which was next on the list, on the

Chemical and Physical Processes employed in the Treatment of Sewage.—In the course of his remarks Dr. Thresh divided the deleterious organic matters contained in sewage into two classes: (*a*) Those held in solution, and (*b*) those held in suspension. The latter, again, may be divided into (1) living organisms, and (2) dead organic matter. The various processes which have been devised for the removal of these impurities may be classified as follows:—1. Subsidence: (*a*) With complete rest; or (*b*) by passing through large tanks with a very slow but continuous flow. 2. Filtration: Through screens or filter beds of gravel, sand, cinders, &c. 3. Percolation through materials exerting some chemical or catalytic action on the organic matter: such as animal charcoal, metallic iron, polarite, magnetic carbide or other compounds of iron, manganese, &c. 4 Precipitation by addition of chemicals capable of combining with certain of the organic constituents, with the formation of insoluble compounds: such as the soluble salts of iron, aluminium, zinc, &c., hydrate of lime. 5. Precipitation, &c., by electrolytic treatment: as in Webster's

process. 6. Destruction of the organic matter by oxidising agents: as by the addition of permanganates and acid. 7. Sterilisation: Where destruction of all micro-organisms is chiefly aimed at, as in the Amines process, or by the addition of chlorinated lime, carbolic acid, and other antiseptics and disinfectants to retard or prevent putrefactive changes. 8. Nitrification: The oxidation of the organic matter by organisms in the surface soil by intermittent percolation of the sewage through specially prepared land. 9. Utilisation of the organic matter as food for growing crops: Broad irrigation. No one of these processes, unless it be the last, was, said Dr. Thresh, capable of giving satisfactory results; but the extent to which the purification should be carried depended chiefly upon the way in which the effluent was to be disposed of. Where it could be cast with safety into the sea or into a large tidal river, purification need not be so complete as where it must flow into a stream or river which a few miles further down furnishes the water-supply to other towns or villages. In the latter case it was absolutely necessary that the sewage should be so treated as to deprive it of all specific organisms, and of the largest possible proportion of both suspended and dissolved organic matters. To effect this, a combination of two or more of the above processes must be resorted to. The combination to be adopted varied according to circumstances, depending chiefly upon the character of the sewage, the position of the town, and the mode in which the effluent was finally to be disposed of.

On the Duty of a Locality to utilise the Nitrogenous Matter in its Sewage for the Benefit of the Nation.—Dr. ALFRED CARPENTER then read a paper with this title, The object of which was to show that localities have duties to the nation to which they belong. The cost of utilising sewage might exceed the financial returns from the cultivated lands, and for that excess the locality utilising the sewage would have to pay; but the author contended that the increased production of crops tended to decreased price, which is a national advantage. He expressed the belief that density of population need not involve high-priced provisions if the excreta of the population be properly used in agriculture; and that it was the duty of a nation to produce a sufficient amount of food for the people, so as to be independent of the foreigner in the event of war. He contended that the non-utilisation of sewage led to conditions which allowed of the production of disease germs and the multiplication of epidemics. He supported his arguments by the results which have been attained in Croydon at the expense of a twopenny rate, and showed that for this there had been a diminished death-rate, illness being correspondingly reduced; fivefold production of crops on the land, giving employment to many people in the open country, in this way withdrawing them from the crowded towns; and a great production of meat and milk; thus to some extent ensuring the nation against the fear of famine if war should break out and supplies from abroad be stopped. The author strongly protested against any measures being taken to destroy the agricultural value of sewage as being opposed to national interests; and, comparing the sewage of London with that of Croydon, showed that it would be a national advantage to utilise the sewage of London as that of Croydon is utilised, and that the nation would be recouped for this expenditure if the interest on the amount expended were guaranteed by the State.

Sewage Farming.—The same author next read a paper on the power of soil and vegetation combined to destroy disease germs, and so prevent the possibility of the spread of enthetic disease in consequence of sewage farming. He referred to the International Medical Congress of 1881, when he submitted a series of propositions tending to prove that sewage farming was safe. He now reproduced five of the nine propositions then submitted. 1. That the judicious application of sewage in close proximity to dwelling-houses does not depreciate the health of the inhabitants. 2. That the judicious application of sewage to land will satisfactorily cleanse the effluent water, and fit it for discharge into any ordinary rivulet or watercourse. 3. That vegetables from fields continuously irrigated by sewage are satisfactory food for man and beast, and that animals fed mainly on sewage-grown crops are as healthy as animals fed on ordinary agricultural produce. 4. The germs which spread infectious disease are not capable of reproduction on properly cultivated sewage farms, the chemical and vital conditions of the surface of the soil being contrary to their further development. 5. In order to produce the results described in proposition 4, it is requisite that the sewage be kept near the surface, moving over the land rather than through it in a downward direction. It must be kept within the influence of vegetable root fibrils and of the humus of the soil, and under-drainage is not a necessity. The author supported these propositions by a reference to the experience gained during the past thirty-one years on the Beddington sewage farm, proofs being adduced mainly from observations made during the last ten years.

The PRESIDENT congratulated Dr. Thresh on the lucid and admirable account which he had given of this important subject. Referring to his own researches into the question, he had felt that hitherto the question of sewage disposal had not been properly founded on a scientific basis. Now they must study the important part which micro-organisms were known to play in purifying organic matter. In the old methods of filtration through beds of sand, there could be little doubt that the purification was not effected mechanically, but by the agency of organisms with which the medium teemed. —Mr. RAECHLING followed with an intensely interesting account of the experiments in progress on the irrigation farms in Berlin. The results were of a very satisfactory kind, and, in fact, confirmed all Dr. Carpenter had said in reference to the process first adopted at Beddington Farm, Croydon.—Dr. GILBERT, who is well known as an eminent authority in these matters said that there could be no question that the land is capable of removing nitrogenous matters, but are objectionable organisms removed. And was it desirable, supposing they were removed, to remove in particular the nitrifying organism which effected oxidation in the effluent. He could not agree with Dr. Carpenter that irrigation would ensure for a large nation like this all that it required in the way of food-supply.—Colonel JONES, whilst agreeing with what Dr. Gilbert had said, thanked Dr. Thresh for the valuable information he had given them in his paper. He always had held that nature directs in all things the utilisation of animal waste for the nourishment of vegetables, and the appropriation of vegetables for the use of animals—in fact, if nature had her way, there would be no waste at all. He scouted the idea of chemical treatment or precipitation, and ridiculed the idea of the addition of the prescribed amount of lime to so many gallons of sewage as directed by the experts to the London Council. Sewage purification, he contended, was a work for micro-organisms to do, and he had long ago suggested Canvey Island as a ground admirably adapted for this purpose. Referring to the objection that had been raised to the pollution of a river that might ensue from the irrigation method, he stated that he had taken a few days ago a very fine trout from the river Wandle, into which the effluent from the Beddington farm is discharged.—Mr. BREMNER alluded to what he regarded as a new system of dealing with sewage—viz., by aeration. Chemicals were useless; chemicals with centrifugal motion were better, but nature's own deodoriser—the air—was best. He had treated many gallons of putrescent material, like sewage, with compressed air, and under special precautions which he had taken in machinery of his own devising most excellent results were obtained. In reply to a question from the President, however, he said that no chemical analyses had been made to show how far this method removed the organic matter from solution.—Dr. C. R. DRYSDALE paid tribute to the excellent work of Dr. Carpenter, whom he characterised as the father of sewage farming, or irrigation. Alluding to the success at Croydon, he said that in consequence of a visit paid to the farm by experts from Berlin and Paris, both places had adopted the system with the same measure of success. It was disgraceful, he added, that London should be behind these cities in this respect, and that what was once a beautiful stream should be by this negligence turned into a river of filth.—Mr. PERRY, who represented the largest parish in the metropolis, had advocated Dr. Richardson's project—that of carrying the sewage by railway to a convenient distance, where the land was suitable for irrigation. He proposed to divide London into twelve districts, in order to deal with the sewage adequately. Chemical treatment was a failure, deodorising was a failure, and disinfecting a farce. He could not help feeling, however, that few persons would offer to live in the neighbourhood of a farm where large quantities of sewage were being treated.—Mr. SELLAR, who was the representative of a well-known precipitation company, did not believe in irrigation, and

upheld proper chemical or precipitating treatment as the best method not only for removing a nuisance, but for utilising the product in a dry state for agricultural purposes. He mentioned that the A B C process, as carried out at Kingston-on-Thames, had given satisfaction to the Thames Conservancy, to the Kingston and to the Surbiton authorities.—Drs. THRESH and CARPENTER having made suitable replies, Sir HENRY ROSCOE moved, and Dr. DRYSDALE seconded: "That, in the opinion of this meeting, the best yet known method of disposing of the sewage of towns is that of purification and utilisation on the land." The motion was carried unanimously, and the meeting then adjourned.

THURSDAY.

On Thursday proceedings were commenced by Professor LEHMANN, who read a lengthy and able paper in German on the Hygienic Importance of Copper.—The President drew attention to the importance of the paper, while Messrs Goodfellow, Cassal, and Dr. Russell entered into a discussion, in which the presence of copper in bread and preserves was chiefly referred to. Dr. Garrett followed with a paper on the action of water on lead. This author's work has already been the subject of comment in our columns. Drs. Russell, Rideal, and Percy Frankland took part in the interesting discussion which followed. Dr. Percy Frankland then read a paper on the Importance to be attached to Magnesia in Drinking-water. The paper was commented upon by Sir C. Cameron, Dr. Drown of Boston, and others. Dr. Bahadurdji of Bombay, in his paper on the Examination of Air, urged the importance of analysing air periodically, just as much as water and food. Drs. Odling and Rideal, Sir C. Cameron, and Mr. Goodfellow expressed opinions on the subject, which were practically in agreement with the views of the author. A contribution of some importance by Dr. Marcet, F.R.S., was next read by the Secretary, on the Effects of the Respiration of Carbonic Acid on Man. Sir C. Cameron and Dr. Odling took part in the discussion. The meeting then adjourned.

SECTION VI.

ARCHITECTURE IN RELATION TO HYGIENE.

Sir A. BLOMFIELD, A.R.A., presided over this Section, and in the course of his opening address propounded the question: "What is the relation of architecture to hygiene?" and remarked that the difficulty of answering lay in the uncertainty as to the strict limits of the functions and duties of the architect. Mr. Fergusson defined architecture to be "the art of ornamental and ornamented construction"; and, speaking of the architect, said: "It would be well if, in most instances, he could delegate the mechanical part of his task to the engineer, and so restrict himself entirely to the artistic arrangement and ornamentation of his design." If this view of architecture and of the legitimate duties of the architect were generally accepted as correct, the relation of architecture to hygiene would be reduced at once to something which was not always easy to trace or grasp, and which had never yet received the full amount of serious and careful attention that it well deserved. If, on the other hand, they took the more usual definition of architecture as "the art and science of building," its relations to the science of hygiene at once became too varied and too complex to admit of clear and concise description. The late Sir Edwin Chadwick seemed to think that art and hygiene were not only unconnected, but even in some respects incompatible; but Sir A. Blomfield did not think it would be difficult to show that such a connexion had, at any rate for certain minds and constitutions, a very real existence. At present, no doubt, large masses of people were still so habituated to the characteristics of their every-day surroundings that they scarcely felt a wish for anything better; but if education and culture continued to advance as they had done in the last fifty years, and habits of intelligent observation were fostered and encouraged, the eyes of the masses would every day become more sensitive and fastidious; the dreary and monotonous streets and badly designed buildings which a few years ago would have been passed unnoticed, would soon begin to exercise a distinctly depressing and disturbing influence on the mind, which could not fail to have some ill-effect on the health, comfort, and general well-being of the community. Having alluded to the manner in which Dr. B. W. Richardson had dealt with the subject of the connexion between architecture as a fine art and hygiene, the President stated that no one could be found better qualified than Dr. Richardson to speak with authority on both the æsthetic and the scientific aspects of the question; but even when writing in the interests of art he was naturally first of all a man of science, and he should like to see the same subject dealt with by an architect from an artist's point of view.

Open Spaces.—The Earl of MEATH then read a paper on Open Spaces, which had been prepared by Mr. Basil Holmes. In the course of the paper reference was made to the great change which had come over the common land, the heaths, downs, forests, woods, moors, and village greens when the demands of the population for houses had nearly swallowed them all up. Now with the great parks, and 200 smaller recreation grounds, the wants of the vast mass of the people were not really adequately met. The best way of meeting the want of the day was a systematic acquisition and preservation of land for public recreation in connexion with the towns and in relation to their growth, and increased facilities for taking people from the towns into the country. The work done in London had secured sixty-five gardens and playgrounds, twenty-three public gymnasia, 166 playgrounds, and nineteen recreation grounds, besides the supply of garden seats, the planting of trees, and the maintenance of eighteen disused burial grounds as open spaces. If the preservation of open spaces were systematically taken in hand, there would be less need for taking people from towns into the country. The need of such spaces was an ever-spreading one, and the work of supplying them required to be done systematically. Preservation was always better than formation, and the more natural the recreation ground the more valuable it was.—Mr. W. WHITE in the course of a discussion which followed maintained that the different classes should not be allotted fixed areas in a town.—Mr. ROGERS FIELD urged that steps should be taken to enforce the keeping of certain spaces open, and urged that boulevards should be formed by planting trees along suburban thoroughfares.—Mr. H. H. COLLINS held that they must look not to the builders but to the landowners to provide open spaces in connexion with houses. Landowners were already recognising that such a policy was for their own advantage, and the pressure of public opinion ought to be brought to bear upon them.—Dr. SYKES said we owed a deep debt of gratitude to our forefathers for burying their dead inside the city, because a great number of the open spaces consisted of disused burial-grounds.—Dr. ELGIN R. L. GOULD (Washington) gave a series of statistics showing the proportion of open spaces to the population of large cities. In London, leaving out the great parks, there were 694 persons to each acre of open space, in Paris 495, in Vienna 473, and in Brussels 637.—The Chairman, in closing the discussion, said it was not the intention of the writer of the paper that there should be any separation between the classes beyond what was involved in the separation of the different classes of houses.

Hygienic Principles for the Extension and Internal Improvements of Towns.—Mr. J. STUBBEN, city architect of Cologne, then read a paper on this subject. He contended that the extension and internal improvement of a town ought not to be left to private voluntary means only, but ought to be ruled and governed by official laws of the district and State. He maintained that what was specially needed were laws—(1) For defining the building lines and plans; (2) for the appropriation of street-land, plots of ground unfit for building by the side of the street, and of insanitary buildings and areas; (3) for the exchange or combination of pieces of ground belonging to the town which, from position, shape, and size, appear to be unfit for building; (4) restricting the erection of commercial buildings where they might become a nuisance; (5) for sanitation in buildings; (6) for sanitation in dwellings.

Hygiene of Groups of Dwellings at Low Rentals formed the subject of a paper by M. CHAS. LUCAS, architect, Paris, who pointed out that the effort to unite, either in a project on a grand scale, or in special quarters of an industrial town, habitations of various classes, such as houses in flats and small houses, isolated or grouped, but for not more than one or two families each, demanded, besides the general study of the hygienic conditions of each of these classes of houses, a special study of the hygienic conditions under which they could be grouped together.

Control of the Construction of Dwelling Houses.—Mr.

THOMAS BLASHILL, Superintending Architect to the London County Council, read a paper under this heading. He argued that it was the right and the duty of the public authority to make and to enforce regulations for the construction of habitable buildings, with proper regard to their healthy occupation. The chief structural conditions of a habitable building which were recognised as being necessary for its healthy occupation were: 1. It must stand upon a site the subsoil of which is naturally dry, or is properly drained and free from impurity, and effective means must be taken to prevent the admission of air from the soil into the building. 2. The building materials—particularly the bricks, the mortar, and the plaster of the walls—must be of good quality, so that neither moisture nor impure air can be admitted through them into the building, and means must be taken to prevent the moisture from the ground rising up the walls. 3. All parts of the building, and not merely those parts which are actually inhabited, must be properly ventilated and lighted, the habitable rooms being of sufficient size and particularly of sufficient height. 4. Provision must be made for the removal of refuse, whether solid or liquid, from the building and from its near neighbourhood before the refuse begins to pollute the air. Having explained the regulations now in force in London applicable to each of these necessary structural conditions, and showed in what respect they were insufficient, he remarked that it ought not to be possible to build a house in which the conditions necessary to healthy occupation were violated. Indeed, this could be prevented where the Model By-laws were in operation, which forbid the occupation of a house until it had been certified to be fit for human occupation. But if this care was necessary in a new house, its necessity could hardly be disputed in the case of old houses, where the conditions are notoriously unsatisfactory. It had been proposed to bring these houses gradually under inspection by fixing a period after which the public authority would be authorised to inspect and order the amendment of defects. This was a matter which, both as to regulations and as to inspection, would demand the greatest care. If it was established, it should apply to all houses without distinction of size or of the class of their occupiers, so that the whole population, the interest of which, as regarded health, could not be divided, should be protected by public law from evils over which individuals could have but little control.

Professor AITCHISON, R.A., feared that if all the suggestions made were carried out, the cost of a building would be so much enhanced that the poor would be unable to pay the increased rents. They must remember the large proportion in the community of the very poor; in fact, he believed half the people of London were not earning more than 10*s.* a week.—Mr. C. S. PAIN (Liverpool) urged that the appointment of building and sanitary inspectors ought not to be wholly in the hands of the local authorities.—Dr. LONGSTAFF said it was common knowledge that the Government had undertaken to bring forward next session a measure codifying and consolidating the Metropolitan Building Acts.—Mr. E. BOND mentioned that the East-end Dwellings Company, of which he is chairman, had been able to build sanitary houses and let them out at rents varying from 2*s.* 6*d.* to 3*s.* per room per week, and secure a 4 per cent. return on the outlay, but the sites had been secured at prices below the strict market value, through the action of the Metropolitan Board of Works and later of the London County Council.—The Rev. HARRY JONES thought the authorities would make no mistake if when they found a bad house they pulled it down. From his experience he believed that the hardship caused by the alleged removal of people from the neighbourhood where they worked by pulling down their dwellings had been very much exaggerated.

After further discussion Mr. S. M. BURROUGHS read a paper in which he advocated the substitution for the usual fire-places, gratings, &c., by a steam heating apparatus, the steam to be supplied from central stations. The plan, he claimed, had already been tried successfully in the United States. Its advantages were that the smoke annoyance could be entirely abolished, economy of heat and labour secured, danger of fire decreased, dust and dirt from fire-places and stoves avoided, and the temperature more easily regulated than by the usual methods. The Section then adjourned.

Cottage Homes in the Neighbourhood of Large Cities.—Mr. ROWLAND PLUMBE, F.R.I.B.A., read a paper with this title, in which he described the plan and construction of a model cottage village, using as an illustration that called Noel Park, in the N.E. district of London. The general drainage of the estate, in accordance with the requirements of the local authorities, has, he said, been arranged on the dual system, the rain and surface water being kept separate from the sewage. No drains run through the houses, back drains with intercepting manholes, specially ventilated, being provided to all terraces. The system of ventilation of sewers has specially been considered, the usual ventilating openings in the roads are arranged to act simply as inlet ventilators, the sewers having manholes at short distances apart, with specially designed valves and upcast ventilation shafts carried above the houses. Automatic flushing tanks are also provided. In laying out the estate care has been taken that all houses are set well back from the road, all having front gardens, and the objectionable practice of bringing the corner houses out to the pavement line of the return roads is in all cases avoided, the corner houses of the terraces being set back, and specially designed and planned so as to form an architectural adornment to the terrace of which it forms a part. There will be about 2500 houses and shops built on this estate, mostly of five different classes, as shown in the plans. About 1305 houses are already built, and are nearly all occupied. The first class houses are built on plots having a frontage of about 16 ft. wide and 85 ft. deep, with a floor area of about 1065 ft. on both floors containing eight rooms, including the scullery. Each house is provided with two sitting-rooms, kitchen, wash-house, and four bedrooms, also a back entrance, with coal-cellar, larder, washing-copper, and watercloset, and in most cases an additional watercloset on the chamber floor. The houses are let at a rental of from 11*s.* to. 11*s.* 6*d.* per week, including all rates and taxes, which are paid by the Company. The second-class houses are built on plots having a frontage of about 15 ft. 6 in. by a depth of 80 ft. The floor area is 936 ft., containing seven rooms, there being only three bedrooms on the first floor. The other accommodation is similar to that last described, except that there is no upstairs watercloset. The rental of these houses is about 10*s.* per week. The third class houses are built on plots having a frontage of 15 ft. by a depth of about 70 ft., and contain a floor area of about 800 ft., containing six rooms, three being bedrooms. The rental of these houses is about 9*s.* per week. The fourth class houses are built on plots having frontages of about 14 feet 6 inches by a depth of about 70 feet with a floor area of 660 feet containing five rooms, there being two bedrooms on the first floor. The rental of these houses is about 7*s.* 6*d.* per week. The fifth class houses are built on plots having a frontage of 13 feet by a depth of 60 feet. The floor area is about 470 feet containing a front living room, with kitchen and small wash-house behind, with two bedrooms over. The rental of these houses is about 6*s.* per week. In addition to the various class houses just described, an endeavour has been made to provide for still further varied requirements by adapting them as flats two storeys high for two families. In the case of third-class houses, where the staircase is shut off, the upper floor being arranged as a separate dwelling, consisting of a living-room and two bedrooms, with an outside staircase down to the back garden, the closet and washhouse being held in common. These are let at 4*s.* 6*d.* per week the lower flat and 5*s.* per week the upper flat. Advantge is taken of the corner houses to get separate entrances at the side. The houses are all built with a layer of concrete over the whole area of the buildings; the walls are of brickwork, the party walls being hollow or 14 in. thick, to prevent the passage of sound between the tenements; slate and cement damp-proof courses are used; the walls are faced with red and yellow bricks, with terra cotta or artificial stone sills and flower guards; the roofs are mostly slated, but to give variety many are tiled, the whole being built with the best materials and designed to have a bright and cheerful appearance. The space under the ground floor is specially ventilated, as are also the rooms, Tobin tubes and deep inner beads to windows being provided to each room. There is a constant water-supply, and no cisterns are used except the water waste preventors to the waterclosets. The sanitary arrangements are of approved yet simple character, all waste and other pipes being discharged over open trapped yard gullies. No soil or rain water drains run through the houses, as the pipes are carried along the back gardens, and are provided with

ventilated manholes for inspection and flushing at suitable distances. There are also similar manholes at the junction of these drains with the pipe sewers in roads.

WEDNESDAY.

Sir ARTHUR BLOMFIELD, A.R.A., again presided on Wednesday in Section VI. There was again a large attendance.

Pile Foundations in Marshy Land, and the Exclusion of Damp from Buildings.—Dr. SYKES (medical officer of health for St. Pancras) read a paper by Mr. P. J. H. Cuypers (Amsterdam) on this subject. The paper pointed out that for many centuries houses had been built on piles in the marshy grounds of the provinces of Holland, Zeeland, and Friesland. In former centuries brick foundations of walls &c. were put immediately on the head of the piles, but the most general mode consisted nowadays in a combination of joists and boards. The hygienic conditions for "souterrains" and cellars built on a wooden foundation were stated to be that the foundation of walls must be laid underneath the water level, the floor or pavement must be above the highest water level, and that in case the floor was situated lower than the surrounding water level, pavement and wall must be constructed waterproof. A quite different method of constructing cellars was used when they were made independent of the surrounding walls, and built by masonry in a floating basin.

Some Sanitary Superstitions in House Building.—Mr. H. H. STATHAM, F.R.I.B.A., next read a paper thus entitled. The chief contention of Mr. Statham was that construction should be such as to avoid places where impurities were likely to lodge and remain undisturbed.

Sanitation in Theatres.—After some discussion, Mr. LENNOX BROWNE read a paper on the sanitation of theatres, which was illustrated by a series of diagrams prepared by Mr. Ernest Turner, F.R.I.B.A. Mr. Browne pointed out that of late years much attention had been given to the comfort and even luxuries of the theatre-goer, and to the protection of places of amusement from fire; but little care had been bestowed upon the sanitary arrangements, especially below the stage and behind the scenes, as well as in the cloak-rooms &c. of the auditorium. The majority of the existing defects were structural.

Mr. ERNEST TURNER explained the diagrams which he had prepared in illustration of Mr. Browne's paper.—Dr. FRANCIS J. ALLAN, appreciating the difficulties with which an architect must have to contend in erecting a theatre on a very limited space, maintained that as a fundamental point a clear air space round every theatre must be insisted on. He believed good work was to be done in the direction which the authors of the papers had followed in regard to concert-rooms. If the County Council, in addition to their supervision of morals, would insist that there was a clear air space round each theatre, then the architect would be able to provide the various adjuncts which were required.—Mr. WALTER EMDEN said that every place of amusement in England had to be built by private money, and he considered that those who invested their money in this way ought to be fairly treated, and ought not to be oppressed by too much legislation.—Mr. Edward J. Domville, Dr. Thomas Dolan, and Mr. Max Clarke joined in the discussion.

THURSDAY.

On Thursday, M. EMILE CACHEUX read (in French) a paper on the Insanitary Condition of Tenement Houses in Paris. He showed that, while in Paris the average death-rate was 24 per 1000, in the "quartiers excentriques" it ran as high as 36 per 1000. He discussed the relative advantages of living in a suite of rooms or flat in a large block, or in a self-contained house, and contended that if self-contained houses were built beyond the city area, the scheme must include a sufficient number to give the tenants such advantages as are met with in towns, and that the rates and municipal charges would have to be distributed more equitably than at present.—Mr. P. GORDON SMITH, dealing with common lodging-houses, said that in London 30,000 persons nightly resorted to these places. The accommodation provided should include dormitories for each sex, day rooms and kitchen, with scullery and wash-house; also the necessary conveniences, lavatories, &c.; and separate rooms or cubicles for married couples.

In his paper, Cottage Homes for the Industrial Classes in the Metropolis, Mr. ROWLAND PLUMBE, F.R.I.B.A., urged the desirability of scattering the industrial population by inducing them to live in cottages in the suburbs rather than in flats of model dwellings in central crowded neighbourhoods. He described a village composed of houses intended for the working classes, and admitted that the success of such schemes depended chiefly on cheap and constant railway and other accommodation being provided.—Dr. WILBERFORCE SMITH in a brief paper advocated flat roofs, chiefly on the ground of their applicability as recreation places.

Dr. SYKES read a paper on Block Dwellings for the Industrial Classes, contending that it only required the framing of by-laws and their due enforcement to ensure that such dwellings would be constructed with a due regard to health. He said the staircase open to the street was rightly regarded as a most objectionable feature. For this the Legislature was largely to blame by compelling the staircase to form part of the street, in order to claim exemption from the inhabited house duty; but he was glad to say that by an Act which was passed only last week block dwellings' staircases, being kept private, would no longer be liable to assessment. These papers led to considerable discussion.

SECTION VII.

ENGINEERING IN RELATION TO HYGIENE.

Sir John Coode, Past President of the Institution of Civil Engineers, presided in this Section. His address will be found in another column.

Sewage Disposal.—Prof. HENRY ROBINSON, M Inst.C.E., read the first paper on Sewage Disposal in relation to Water-supply and River Pollution. Having called attention to the fact that centres of population which are in proximity to rivers invariably regard them as the natural means of conveying from their midst every kind of fluid refuse, both manufacturing and domestic, he pointed out that experience had shown the unwisdom of this, and efforts were now being made to undo the mischief. It was of the utmost importance that in the future the sewers should be so designed as to remove and not retain the foul matters that were delivered into them. He protested against the discharge of sewage or manufacturing refuse into streams to avoid the expense of previously treating it. He emphasised the necessity of placing rivers under continuous chemical and engineering observation, and described the manner in which the subject is dealt with by the State Boards of the United States, and in conclusion urged the importance of studying the treatment of rivers under the control of different authorities by joint action, with a view to effectually prevent the pollution of rivers and their better conservation for purposes of water-supply.

Drainage of Towns in Italy.—Professor PACCHIOTTI (Turin) read a paper on this subject, gave an account of the sanitary reforms now being prosecuted throughout Italy, and discussed the relative advantages of the "separate system" of drainage and of that advocated under the title of "le tout à l'égout." The conclusions which he submitted to the Congress were that "every town must select that system of sewage disposal which is best adapted to its own circumstances, since there is no one system universally applicable. The tout à l'égout system most nearly approaches perfection, and should be adopted by all towns possessing ample water-supply and appropriate gradients. Towns possessing suitable soil in or near to their immediate neighbourhood should establish sewage farms for the purification of their sewage, and to the advantage of agriculture. Unless absolutely unavoidable, sewage must never be allowed to flow into the watercourses in or near to towns, since chemical and bacteriological investigations show that such a practice produces pollution of the water strictly comparable to that by fouling from cesspools."

Papers were then read by Mr. BALDWIN LATHAM on Sanitation in India, by Mr. J. A. LEMON on French and English Sewerage, by Mr. R. E. MIDDLETON on the Removal of Sewage after leaving buildings, and by Mr. A. MAULT on Sanitation of a Mining Settlement.

In the discussion on these and the preceding papers, in which Lieut.-Colonel A. JONES, M. BECHMANN (who, speaking in French, maintained that the French towns were making great progress in sanitary matters), Mr. GILBERT THOMSON (Glasgow), Mr. JAMES THOMSON (Edinburgh), and others took part, it was urged that an arrangement might be made by which the separate system

could be adopted in a modified form without the necessity of a double set of drains &c.

Mr. W. SANTO CRIMP then read a paper on Sewer Ventilation, and Mr. R. READ (Gloucester) another on Sewer and Drain Ventilation.

The Section afterwards adjourned.

WEDNESDAY.

On Wednesday this Section resumed its sittings under the presidency of Sir John Coode.

Water-supply.—Mr. ALEXANDER R. BINNIE, M. Inst. C.E., and Engineer-in-Chief of the London County Council, read the first paper, his subject being water-supply. He said we might be confident of two facts: first, that water subject to pollution was a very potent factor in the spread of disease, and, secondly, that there was possibly no better mode of introducing into the human system any substance which it could absorb than by drinking it in the form of a solution. This being the case, it almost followed as a natural consequence that the utmost care should be taken to guard our supplies of drinking-water from contamination. Wells were frequent sources of death and disease, due to the contamination from house drains, as had been shown in the cholera outbreaks of 1849, 1854, and 1866, which caused the death of over 16,000 persons. Chemical science in many cases was of little assistance, as it was powerless to detect the germs of disease. Neither land filtration nor precipitation and clarification of sewage effluent by chemical agency could be altogether relied on. What, then, were we to expect from the continuance of supplies to large cities from polluted sources but that such cities might go on for years, perhaps boasting of the purity of their water and their low death rate, forgetting that the constitutions of their water consumers were gradually being prepared to receive the germs of some great epidemic.

Domestic Water-supply.—M. BECHMANN, Professeur à l'Ecole des Ponts et Chaussées de France, followed with a paper on two waters of different qualities by distinct systems of pipes. The author examined the question as to whether the system of double distribution, such as has obtained in Paris since 1854, for example, should be generally adopted; and whether it was in any case desirable, or from a hygienic standpoint permissible. His concluding propositions were—(1) That the ideal water-supply of a town consists in the uniform distribution of potable water suitable for all purposes; (2) that should particular exigencies necessitate the expedient of a double service supplying two waters of different qualities, only one of these being potable, the double service must not be introduced into private houses, where potable water only should be at the command of the consumer.

Mr. W. MATTHEWS, M. Inst. C.E., read the next paper, which gave an account of the Separate Water-supply for Domestic and Sanitary Purposes at Southampton. He explained that until 1852 the town of Southampton depended for its water-supply upon the surface drainage from the common and adjacent lands, but a supply pumped from the river Itchen was then introduced, and remained in use until 1888, when new works were established, drawing a supply from wells sunk in the chalk eight miles to the north of the town. The water from this source was abundant and of great purity, but somewhat hard, and to remove this hardness a softening process had been adopted, with great success. This formed the domestic supply. On the new works being initiated, the author drew up a scheme by which the water collected from the drainage of the common, then running to waste, could be used for sanitary purposes, the pipes from the old reservoir being utilised, as also the duplicate mains in the streets.

Mr. MAIGNEN maintained that the attention of the Section ought to be devoted to the question, How was water to be purified? It had been proved that hard water was the cause of gout, and if in these days of scientific advancement they were not to attempt the problem of purifying water, it was not worth while to assemble together.—Professor H. ROBINSON said recent observations had shown that certain organisms were not arrested by the passage of the water in which they were contained through sand. At the same time they ought not to be alarmists, as so many large communities depended for their water-supply upon sources which were subject to slight pollution. That streams purified themselves was true to a very large extent, but in the metropolis he did not think it was correct to attribute the low death-rate to the fact that the water-supply came from the Thames, because he believed it was more due to the sanitary precautions which were now so generally observed. He did not say the London water-supply was bad, but he would not allow anyone in his house to drink it unfiltered.—Professor EDWARD FRANKLAND agreed that among the conditions necessary for the maintenance of a satisfactory hygienic condition in towns, a supply of pure water was the most important. The more investigation was made into the sources of infection, the more did it appear that infectious matter was not capable, except in exceptional circumstances, of being conveyed by sewer air. It was with extreme difficulty that a solid or a liquid could be suspended in the gaseous atmosphere of a sewer, unless they had very badly constructed sewers in which the sewage was undergoing active fermentation. He believed sewer air was much freer from organisms than the air we breathed—in fact, there were a thousand times more organisms in the air of the room in which they were met than in a corresponding quantity of air in a sewer. Developed bacteria were killed in flowing water, but the spores were not, and as these spores were capable of development, these were the dangerous bodies to which they had to look. Experiments had shown that these spores would not only pass through sand filters, but through a great thickness of porous material. He did not know of any other method of purification except boiling, which was practically impossible in the case of a big supply for a town.—Mr. BALDWIN LATHAM said that experiments had shown that many of the germs of disease were absolutely destroyed by light, but in underground sewers the germinal matter of disease might be carried for miles.—Dr. ODLING emphasised the purifying power of rivers. What was true of the developed organism was not true of the spores or eggs—the bacteria could not exist in running water, so that the point was the risk of drinking water in which these spores might be. He believed that the animal body had a definite power of preventing the development of these objectionable microbes, and it was only when the number got beyond that which the body was capable of resisting that the danger arose. For his part he was prepared to drink one spore every day of his life without fear that his life was in danger.—Mr. BINNIE, having briefly replied to the discussion, papers were read by Mr. W. Anderson on Revolving Purifiers, Surgeon-Major Pringle on the Water-supply of India, Mr. Baldwin Latham on Underground Water in relation to Health, and Mr. R. F. Grantham on Drainage and Irrigation in relation to Health.

The Section then adjourned.

THURSDAY.

On Thursday Sir John Coode again took the chair in this Section.

Self-purification of Rivers.—Professor EDWARD FRANKLAND read the first paper, the subject being the Present State of our Knowledge concerning the Self-purification of Rivers. He gave a detailed account of the experiments which had been made, stated that a careful study led to the inevitable conclusion that sedimentation was the main cause of any self-purification in river water, and that of any rapid oxidation of dissolved organic matter there was no reliable evidence. He held that we must not, on account of this sedimentation of microbes, relax our protective measures to exclude contamination from our streams, bacteriological research indicating, on the one hand, the value and importance of purifying all dangerous liquids before admission into rivers, and, on the other hand, of submitting the water drawn from streams for town supply to the most careful subsidence and filtration, through sand, before delivery.—After a brief discussion a series of papers were read on the removal treatment or disposal of town refuse, the authors being Mr. C. Jones, Dr. Wëgl, Mr. J. F. Meyer, Mr. W. G. Laws, and Dr. Miller Bruce.

SECTION VIII.

NAVAL AND MILITARY HYGIENE.

After an introductory address by the President on Tuesday, dealing mainly with the improvements in military hygiene since the Crimean War, and eulogising the American nation for the care bestowed on the wounded in the Civil War, papers were read for Dr. MONTIZAMBERT of Quebec

by Dr. COLLINGRIDGE, in his absence, and by Dr. VIGNARD of Paris, on Modern Quarantine. Both papers dealt mainly with the disinfection of ships, passengers, and cargoes. It cannot be complained that the system advocated by Dr. Montizambert is not sufficiently rigorous. The vessel and its contents are drenched with a strong solution of mercuric chloride and fumigated with sulphur dioxide. As measles is included in the list of diseases for which disinfection is thought necessary in Canada, and as phthisis is now also classed with the infectious diseases in the United States, and the sufferers returned to their own countries, the port sanitary authorities in America will evidently have plenty of work. It is amusing to hear that while they are to safeguard the community, they are also to be careful of interfering with the liberty of the subject and of the financial value of the cargo. It need hardly be said that such extreme views met with no support from the various speakers who took part in the discussion.—Dr. COPPINGER followed with a paper, pointing out the necessity of improved ventilation and warming of men-of-war, especially ironclads, and Dr. Stopford Taylor of Liverpool (whose paper appears in another part of our impression) pointed out the disadvantage of the division of authority between the doctors appointed by the Board of Trade, the quarantine doctor selected by the Customs, and the medical officer of the port sanitary authority.

WEDNESDAY.

This Section was mainly engaged on Wednesday with papers and a discussion on Scurvy.—Mr. SPOONER (Liverpool) read a paper advocating a dietary scale, which is a marked improvement on that now in vogue, but which had been recommended by the Board of Trade in 1883; and Dr. CURNOW read a paper (see p 349), illustrated with tables, on the cases of scurvy which had occurred at the *Dreadnought* and the Seamen's Hospital since 1852, the ports to which the vessels belonged, and the ports from which they made their last passages. In the course of the discussion Dr. Rae gave a most interesting account of an outbreak of scurvy in the Hudson Bay territory some fifty years ago, in which the patients were cured by a free use of cranberries, which he found growing close to the station.—Dr. Collingridge urged the necessity of the Board of Trade gaining increased powers, whilst Mr. Swanston from the Board of Trade urged that an Act of Parliament to give that department compulsory powers would be very unpopular, and that the health of seamen had much improved in recent years.—Mr. Tomatsuri said that the Japanese sailors never had scurvy, as they lived principally on a vegetable diet, but that they suffered greatly from "kakké."—Mr. Spooner explained in answer to a question that the lime-juice supplied at English ports was always tested at Somerset House.—Dr. Curnow read another paper dealing with the diseases of seamen admitted at Greenwich from 1880-9. In the discussion it was pointed out that phthisis was obviously largely due to the want of ventilation of the sleeping-rooms, seventy-two cubic feet of space—too suggestive of the area of a coffin, as one speaker remarked—only being required by the Merchant Shipping Act.—Dr. Walford next pointed out the deficiencies in port sanitation, after which the Section adjourned.

THURSDAY.

Thursday morning was chiefly occupied with a discussion on Enteric Fever as affecting Troops in India and on Active Service, and there was a large attendance of military surgeons, many of them belonging to foreign armies. The following papers introducing the subject were read: Enteric Fever in the European Army in India, by Professor Notter of Netley; Enteric Fever amongst Troops on Active Service, by Surgeon A. M. Davies; Camp Fevers, by Dr. J. E. Squire; and Prophylaxie de la Fièvre Typhoïde dans l'Armée Française, by M. le Docteur Schneider.

SECTION IX.

STATE HYGIENE.

This Section met at 10 o'clock, Lord Basing, the President, in the chair. There was not a large attendance.

Lord BASING, in the course of his introductory address, said though he had no professional claim on their attention, it had fallen to his lot to be associated with the administration of public health in this kingdom, and he was aware of the successive steps by which that system of administration had been built up during the last half-century. It must be admitted that in England they had never had any attempt by responsible statesmen to lay down *a priori* any code having reference to the public health. The matter had grown up in a somewhat clumsy and English fashion founded upon experience of mankind, and gradually ripening to something definite and satisfactory. The provisions of the various public and sanitary Acts which were passed during the early part of the time he alluded to were founded for the most part on the best of all foundations—experience. In the early days when attention was drawn to the need of drainage, water-supply, cleansing, and services of that kind, the great towns of the kingdom, stimulated, no doubt, after a while by the successful working of that great statute, the Municipal Corporations Act, led the way in applying to Parliament for private Acts to enable them to do that which, without parliamentary sanction, they had no legal title or obligation to do, to borrow money and expend it on useful sanitary works, and to improve in that respect the health of the communities over which they held sway. Parliament, seeing the growing need of administration of the kind by general Acts, enabled urban localities to be set apart from the great corporations and towns which already had their organisation, under the designation of Improvement Commissioners and local board districts, to which were given similar powers and functions. So things went on, and perhaps it was still more characteristic of the state of things which occurred that every visitation of cholera was immediately followed by activity in the passing of fresh sanitary Acts. The first visitation of cholera occurred in 1832. The outbreak of 1869 was remarkable for the appointment of Mr. (now Sir) John Simon to the position which he filled with so much distinction and advantage to the public, first of all as medical officer to the Privy Council, and after to the Local Government Board. In 1870 the time came for the appointment of a Royal Commission, and from the report of that Commission they might date all the subsequent improvements which had occurred. In 1872 and 1874 the whole of its recommendations were carried into effect, the most important of them being the appointment of a sanitary authority in every sanitary area throughout the kingdom, these sanitary areas being taken as those areas under the control of the guardians of the poor. In 1875, being then President of the Local Government Board, he (Lord Basing) was enabled to pass through Parliament a great Consolidation Act called the Public Health Act, which not only put together the provisions of between twenty and thirty existing statutes, but established what he believed was the most complete code of sanitary law which existed in the civilised world. The metropolis had been exempted from this statute, and it was only this year that the whole of the improvemets effected over the country generally in 1875 had been satisfactorily established within the metropolis. The administration of the Public Health law had resulted in the short period of twenty years in the reduction of the annual death-rate of this kingdom by about one-seventh. There were now 1569 sanitary authorities, of which 575 were rural and 994 were urban. Of the rural authorities, medical officers of health had been appointed in 529 cases and 528 inspectors of nuisances; in the case of urban authorities 691 had medical officers of health, and 625 had inspectors of nuisance under public surveillance and control. He hoped he had shown that England had not been behind hand in the race. No doubt from the official expert point of view all that had been accomplished in the matter of public health was trifling in comparison with what should be done. They would desire, no doubt, more inspectors, more reports, more public expenditure, more clear recognition, and a more definite title than they had at present to the functions they discharged, and to the Minister under whom they worked. But Parliament and the public would not readily accept such conditions as these without some demur. They would ask for what purpose had local areas and local authorities been set up if it was not to render them self-reliant and independent in the discharge of their duties, and for what purpose had information been collected at head-quarters and disseminated if not for the training and guidance of local administration. This consideration led him to the practical question, What should they do now in the way of improvement? Should they endeavour to centralise more than had been done hitherto, or should they be content to see the administration of public health decentralised and carried on from local centres. A statesman was apt to compromise on matters of this kind. His view

was that they had gained a great success by adopting the existing system of local administration. He doubted very much whether it would be expedient or desirable to separate the one from the other. That might be an ideal to be aimed at, but he did not at the moment see a sufficiently popular basis upon which that separation could be effected or attempted. On the question of decentralising and losing in any way the control which the Local Government Board now exercised over the administration of the Public Health Act, upon that again his contention was that, however plausible the cry for decentralisation might be, it should never be carelessly taken up as applicable to all subjects indiscriminately. In particular, his strong conviction was that, without there was a public need for a new system to be introduced, which was *prima facie* of a popular character, which implied interference and an obligation on the part of the State upon all localities, to adopt within reasonable limits similar precautions, and to bind them by similar Acts of Parliament—the necessity of State control was absolute, nothing would ever be done. He was not in favour of decentralising in an unreasonable way, such as had taken place in the County Councils Act with reference to the appointment of medical officers. He did not think the time had arrived when it would be expedient to take over from a highly trained central department of State the control in these matters. Far be it from him, however, to say that any ardent reformer should ever be content with what had been accomplished, or that the State should ever hold the doctrine of finality in this respect. After acknowledging the efforts of other nations in regard to the improvement of public health, the noble lord concluded by expressing the hope that the work of the Section would do much to throw light on the position which the State should occupy in regard to sanitation in highly civilised countries.

Formation and Organisation of Local Boards of Health.—Dr. SIMON (Breslau) then read a paper on this subject, in which he submitted the following suggestions: 1. To introduce and adopt uniform measures for maintaining public health, and subject them to a continual control, especially for paralysing effects of infectious diseases, local boards of health should be established under State control, including, among other functions, the hygiene of dwellings, notification of infectious diseases, and disinfection. 2. Such board should be subject, if possible, to the local boards of self-administration. If the poverty of any community did not allow of their being established, Government should furnish a corresponding subvention. 3. A physician, giving his whole time if possible, should be at the head of the local board; to him all the technical staff should be subordinated. 4. In towns whose extent and population permitted, only one such board should be established. Towns of over 300,000 inhabitants might have several boards with similar organisation, each acting under a municipal head board and under medical direction. 5. In forming rural boards of health, regard should be had to any suitable existing political demarcation, territory (districts, parishes, &c.); a uniform system of administration should be observed. Such administrative districts might, according to local conditions, contain 50,000 to 70,000 inhabitants. 6. For more readily ascertaining the predilective seats of certain diseases, the whole district should be divided into subdistricts of 20,000 to 30,000 inhabitants (each under a sanitary inspector), and each of these subdivided into equal sections of about 1000 inhabitants, and of these, again, each should be particularly and separately considered and elaborated in a medico-statistical way. 7. The form of service should be:—(*a*) internal, (*b*) external; and the functions of the board should be: (*a*) determining, (*b*) controlling, (*c*) executive. The following branches of public health were to be subject to the board in the form of particular sections—viz.: (i.) A general section for the board of works, sewerage, water-supply, regulations for the construction of public and private buildings; (ii.) chemical board of inquiry into food, aliments, and drugs, as well as objects of use; if possible, joined with a bacteriological station, especially for examining disinfecting processes, and control of disinfection; (iii.) a board dealing with notification and disinfection, and with the hygiene of dwellings and schools; (iv.) section for statistics relating to hygiene and medicine. 8. The internal and external service of Section III. should be organised so as to facilitate co-operation with the least loss of time. For this purpose (*a*) the duty of notifying certain diseases named by Government should be obligatory; (*b*) the expenses of notifying should be repaid; (*c*) the inspecting and executive officers should attend at the board's office at fixed times, to deal with notifications and receive orders; (*d*) so far as is compatible with the rights of private persons, the entering of dwellings and (*e*) the enforced removal to hospital of persons suffering from infectious disease, particularly when insufficiently isolated, should be made legal; (*f*) disinfection outside the house should be effected solely in the board's institute for disinfection, and the disinfection of houses and lodgings solely by appointed disinfectors; (*g*) disinfection in this institute should be available for all classes. No charge should be made for disinfecting dwellings of the poor below a certain rateable value.—The only speaker on this paper was Dr. WILLOUGHBY, who said that there was one point in it which seemed to be ignored in this country, though adopted across the Atlantic—namely, that of having a body of experts for the administration of the public health. The maxim of our constitution, he believed, was that, for every subject, persons perfectly unacquainted with it were the best administrative authorities; and he, for his part, believed the boards of health were composed of persons perfectly ignorant of the subject, and too often included the offenders against the laws of health. Why was it that the Prevention of Rivers Pollution Act in Lancashire was a dead letter? Just because the local authorities were composed of the manufacturers who polluted the rivers. We should never take the position which we ought to hold in the forefront of sanitary progress until we had our sanitary committees, call them what they liked, composed of men conversant with the various sciences and arts connected with the preservation of the public health.

Sanitary Legislation in Ontario.—Dr. J. J. CASSIDY (Toronto) read a paper upon Sanitary Legislation in Ontario for the prevention of epidemic, endemic, epizootic, and other contagious diseases. He described the conditions prior to 1882, when the Act to establish a provincial board of health was passed. In this Act much-needed clauses were enacted providing for the isolation of cases of small-pox and the compulsory establishment of small-pox hospitals. After two years' experience, it was felt that better local organisation was necessary than had been provided for, and that if executive work was to be carried on it would be necessary to find a channel through which the provincial board could reach the people. The outcome of this thought was the Public Health Act of 1884, which makes it incumbent on all municipal councils to form local boards of health each year immediately after the councils themselves are elected, and by which all boards possess the powers hitherto vested in the councils regarding health matters. In four months after the passing of the Act, in the 447 townships of the province, 184 local boards were formed, 23 of these having medical health officers, and 19 of them sanitary inspectors, while 17 had appointed both medical health officers and sanitary inspectors. In the 203 cities, towns, and villages of Ontario there were 180 local boards established, and of this number 63 had medical health officers, 92 had sanitary inspectors, and 44 had both medical health officers and sanitary inspectors. Among other provisions, physicians and householders were obliged to report cases of small-pox, scarlet fever, diphtheria, cholera, or typhoid fever, and there were also provisions for removal, isolation, and inspection of flesh, milk, &c., and cleansing and disinfection. The present degree of organisation in health matters in Ontario was as follows:—(1) Provincial board of health, consisting of seven members, all physicians; the board met quarterly, and had certain powers; it had a chemical and bacteriological laboratory; (2) 576 local boards; and (3) 356 of these had medical health officers. An accompanying table showed the mortality in an urban population of 355,931 in Ontario for 1889 from small-pox, scarlet fever, measles, diphtheria, typhoid fever, and phthisis:—Small-pox, no deaths; scarlet fever, 27 deaths; measles, 16 deaths; typhoid fever, 148 deaths; diphtheria, 207 deaths; phthisis, 678 deaths. The Vaccination Act provided for compulsory vaccination of infants, but in practice it was not enforced, except in times of epidemic. The percentage of unvaccinated persons is, however, small. Most vaccinations were done with bovine lymph, the humanised article being but little used. Opposition to vaccination was confined to a few, and those of but little influence.—Some discussion followed, in the course of which Mr. HAMPTON (London) asked if there was any law compelling medical men to dis-

infect themselves.—Dr. COVERNTON (Ontario) spoke of the difficulty experienced in connexion with vaccination amongst the French Canadians, especially in Montreal.—Dr. BRUCE (Boston, U.S.A.) observed that self-interest of medical practitioners sometimes prevented isolation until too late. In order to properly quarantine the sick, a hospital which would take care of the members of the family as well as the patient was also necessary.—Dr. WHITAKER, medical officer of health, Belfast, said they had in that city no notification, and only the poorest class were under observation. There was no hospital for contagious diseases. The workhouse only was available. There was great need for temporary shelter for families during disinfection.—Dr. BRIGGS (Leicester) protested against the tendency to demand compulsion, and contended that isolation was a sufficient precaution without compulsory vaccination.—Dr. CASSIDY, in the course of his reply, submitted that isolation, disinfection, and vaccination were the three influences for the prevention of small-pox.

Sanitary Work in Dublin.—Sir CHARLES A. CAMERON, Superintendent Medical and Executive Officer of Health for Dublin, read a paper in which he gave the results of ten years' sanitary work in Dublin, from which it appeared that as compared with 1876–80 the death-rate decreased in 1881–90 15·59 per cent. in the whole area of the city and suburbs, and the zymotic death-rate decreased 44·05 per cent. in the whole area, 43·23 per cent. in the city, and 36·09 per cent. in the suburbs. In 1891 the improvement in the state of public health of Dublin continued. During the first thirty weeks of the year the death-rate was 2·8 per 1000 under the mean rate for the corresponding period in the previous ten years. Typhus fever had lately almost completely disappeared. On the other hand, typhoid fever had not decreased. Very few cases of diphtheria occurred in Dublin. Small-pox had long been extinct. A few years ago Dublin had a much higher death-rate than any of the large English towns; lately several English towns exceeded it in mortality. With respect to its zymotic death-rate, Dublin now compared very favourably with the English towns. In the discussion which followed, Mr. Ballingall (Dundee), Dr. Thomas Grimshaw (Registrar-General for Ireland), Dr. Whittaker (Belfast), and Sir John Banks (Dublin) took part.

The State and Scientific Investigations.—Dr. HY. TOMKINS, medical officer of health, Leicester, read a paper on this subject. He said the expediency and desirability of the State undertaking scientific investigations into the origin and cause of disease were almost self-evident. It was practically impossible for any unaided private individual to effectively obtain all the detailed information necessary to arrive at any approximately accurate or complete conclusion. As arguments in support of the proposition, many such scientific investigations had been already undertaken more or less under the direction of a Government department, as, for instance, in many of the recent reports to the Local Government Board the heading "Auxiliary Scientific Investigations," by experts skilled in their various departments of science, and most of these were not permanent members of the medical staff of the Local Government Board; also amongst the work of the permanent staff similar investigations have frequently been undertaken—e.g., valuable reports issued by Dr. Ballard, Mr. Power, and others, work of like nature being curtailed by the demands of ordinary routine work upon the staff of this department. Diseases which specially call for scientific inquiry were—cancer in its various forms, the causes of its marked increase of late years, and its apparent special incidence upon certain districts; diphtheria, and its largely increased prevalence during the past decade in our large urban communities; summer diarrhœa, with its enormous annual infantile mortality, varying so largely in different parts of the country; the etiology and transmission of tuberculosis, especially its connexion, or otherwise, with the same disease in the lower animals; the origin and causes of infectious pneumonia; to say nothing of abnormal visitants to this country, such as influenza, cholera, &c. The number of men capable and desirous of carrying on such investigations as the above work calls for was by no means large; and often those most fitted for it were unable, from pecuniary reasons, to devote their time to such studies; and such work carried with it but little monetary reward. Again, the benefits resulting from increased knowledge respecting health and disease conditions became the property of the whole country and world, and it was therefore but reasonable to ask the State to provide adequate emoluments and encouragement for scientific workers, whose labours had for their ultimate object the health and physical wellbeing of every member of that State.

Dr. A. E. WRIGHT (Dublin) read a paper on the same subject, in which, answering the question "Should the State undertake the support of laboratories for the investigation of disease?" he said the political aspect of the matter depended upon which of the following alternative standpoints was adopted: "(*a*) The State shall undertake every function that can be advantageously undertaken by it; (*b*) the State shall undertake only such functions as it cannot, without detriment to itself, refuse to undertake." The question stated in the title was to be discussed from this last standpoint. The State already undertook, but only very incompletely, the investigation of the cause of disease; therefore it was proposed that the State should undertake, not a new function, but the better discharge of a function already undertaken. In consequence of this function not having been discharged, England had had to lead a parasitic existence, depending on the Continent for the training of her scientific workers, and failing to do her share in the work of research.

A short discussion followed.—Miss GOFF (Norwood) remarked that this experimental research came to us from abroad. It was often said that it helped us to put down one plague and another, and that we in this country ought to copy what was done abroad. She was quite willing to look abroad and take the results, but looking at them she hoped we in England would be protected from such degrading experiments as were being carried on in Berlin and Paris with regard to cancer and hypnotism.—Dr. HAUGHTON (London) said he knew there had been large and expensive investigations, which had resulted in nothing. Besides that, his own study of the subject convinced him that very often results had been misleading. He did not think they were justified in appealing to the Government for funds.—Dr. CHAPMAN (Paris) said it seemed to him that the tendency was growing in England to constitute the Government the agent for every variety of function; but he thought it was a great mistake to ask the Government to undertake matters of medical administration, and he felt confident if they did so there would be a great reaction in due time. He thought they ought to be very jealous in calling upon the State to give its sanction, and to tax the people to carry out various views which were formed upon this subject.

This finished the business for the day.

WEDNESDAY.

On Wednesday Dr. E. RITTER VON HOFFMAN (Vienna) took the chair, in the absence of the President, Lord Basing.

Housing of the Working Classes.—Dr. ELGIN R. L. GOULD (expert in U.S.A. Department of Labour at Washington) read the first paper on this subject. He said that practical observation and study of the conditions under which an untold number of human beings must live in the metropolitan centres of the old world and the new, had led him to look chiefly to the only power he believed to be strong enough to cope with them—namely, the State. The existence of some form of sanitary control everywhere was the best evidence of its necessity. Let it, then, be endowed with sufficient authority to render its acts effective, otherwise confidence would fall and public opinion give but a half-hearted support. He thought the most effective of all regulations would be one requiring every owner of houses offered for rent to take out a licence from the health authorities, such licence to be gratuitous, and conditional only upon the sanitary state of the premises; and he should be liable to produce a proper certificate upon the demand of an intending lessee.

The Homes of the Poor.—Mr. JOHN HAMER, honorary secretary of the Mansion House Council on the Dwellings of the Poor, read the next paper. The health of the people, he said, was a large factor in producing the wealth of the State. The home of the worker had a most powerful influence on the work and the workman. An ideal society would be that in which each individual knew the value of a love of order, decency, and a proper degree of independence. Personal intercourse of the various classes of society was best calculated to promote sympathy, hope, and courage. State regulations would not produce good citizens unless the citizen understood and adopted them. Centralisation was a bugbear to many people, and local government, where shared by the people themselves, was greatly to be preferred.

There were, however, certain things, such as health and education, which were so vital to a nation that their control should be a national one—in other words, a matter for the State. If ignorance fostered crime, insanitary conditions resulted in enfeebled manhood, and miserable homes meant a low state of mental as well as moral health. Coöperation could do much, and the acquirement of their own homes by thrift distinctly raised the level of the working classes. Improved dwellings, especially on the block system, were not an unmitigated blessing. The cottage community was the best, but the cost of land in towns made it impracticable. Railway companies should be compelled to run cheap trains within a fixed zone round every city. The unused land frequently held by railway companies should be utilised for building cottages to which the cheap trains would bring occupiers. Municipal enterprise could do a great deal, by providing better houses, and especially lodging houses. The important elements of life represented by water-supply, artificial lighting, and open spaces to secure fresh air, should be under popular control. No commercial company ought to be allowed to make money out of a monopoly in the supply of these vital necessities. Imperial control should be exercised over local authorities as to the efficient working of all sanitary Acts. One locality, by the neglect of these, might spread an epidemic throughout its better administered neighbours. Medical officers of health should be State servants, not subject to property owners or the local authority. The promotion of sanitary reform should be held high above all party politics. Its three cardinal points were: (1) A Ministry of Health with a properly paid and highly intelligent staff of officers; (2) the cordial coöperation of all classes in local administration; (3) the education of the people in the duties and responsibilities they owe to each other in the maintenance of cleanly and well-ordered homes.

Mr. THEODORE THOMSON, medical inspector of the Local Government Board, also read a paper on the subject, in which he stated that the leading impressions suggested to him by his experience were that although the present sanitary laws were open to improvement, yet the most crying present need was not so much change of or addition to those, as a thoroughly efficient and complete system of health administration by capable and independent medical officers throughout the whole country, and that the final and complete solution of the problem of how to house the poorer classes was inextricably bound up with a great social difficulty, of which the settling would come to pass either prior to or coincident with the settling of that which had been the subject of the paper.

The Sanitary Registration of Buildings in regard to Drainage and Water-supply.—A paper by Mr. HENRY RUTHERFURD, barrister-at-law, on this subject was read in his absence by Mr. LITHIBY. Assuming that all dwellings, though requiring sufficient ventilation and other advantages, should, above all things, be supplied with good drainage and protected water-supply, the following questions arose:—1. Does law provide sufficiently for the two latter requisites? and, if not, is it expedient to ask for legislation in the meanwhile for these alone? 2. In view of the immense number of dwellings already erected whose arrangements fall short of ideal standard, should legislation compel alteration of such dwellings to that standard, or to some lower one, or leave all except certain classes of buildings to existing regulations? 3. Is further sanitary legislation required for new buildings? 4. What should be the means of enforcing regulations now or hereafter enacted? The replies he suggested were:—1. Law does not regulate drainage and safe water-supply of dwellings according to modern views of sanitation. Bad ventilation was obvious, and the maxim "caveat emptor" applied. Bad drainage and contaminated water might be concealed defects, insidious and fatal in their consequences. Legislation for the latter alone was, therefore, urgent in the meanwhile. 2. Distinction should be made between the present and future buildings. Existing dwellings could only be adapted to ideal standards with difficulty, and after considerable expenditure. Sanitation, though of lower standard, might, nevertheless, be insisted on at the end of a long tenancy or period of years; but it was strongly urged that certain classes of dwellings, though now in existence, should have the obligation of modern sanitation imposed upon them—viz., hotels, houses let as lodgings, Board schools, and workhouses—on the ground of necessities of the position of their respective inmates. 3. Legislation was required for new buildings to introduce a higher standard of sanitation, for giving greater safety to appliances already required for house drainage, and for safeguarding an otherwise good water-supply. 4. Sanitation should be enforced by the establishment of a sanitary register in which to enter every building used to any extent as a dwelling, on production of a certificate of its good sanitary condition, such certificate to be obtained from medical officers of health or other persons or bodies qualified in sanitary science. No house should be let or occupied without such certificate under penalties, and there should be penalties for false certificates.

Housing of the Poorer Classes.—Mr. S. M. BURROUGHS, F.R.G.S., also submitted a paper, in which he said the chief difficulties in the way of the housing of the poorer classes appeared to be—first, the necessity of living near their work, which led to congestion in towns and cities; secondly, the dearness of land, which arose partly from the same cause; thirdly, the rates and taxes upon houses; and fourthly, the average inability to pay for good houses among the working classes. The first difficulty could be mitigated or removed by free travel, and while this might appear very utopian to some people, it was, he believed, easily practicable, and that without robbing anyone for the benefit of others. Free travel of course involved the purchase of railways by the State. They now made average dividends of 4¼ per cent., whereas the Government securities would float at 2 per cent. The saving of interest alone to the public would amount to £10,000,000 per annum. The strongest objection to free travel was that, if it had to be paid for out of the Consolidated Fund, the pecuniary benefit would go chiefly into the pockets of owners of suburban lands. The tendency of free travel was to make land in the suburbs equally valuable to that in towns. It was therefore submitted that it was reasonable and just to tax land values imparted by free travel to pay for the same. If the principle was correct that land values created by the public expenditure should be taxed to recompense the public for the expenditure, it then followed that the cost of constructing roads and streets and sewers and keeping them in order, the expenses of lighting, planting of trees, &c., should be paid for out of the so-called unearned increment upon land which arises on account of public expenditure and the neighbourhood of a civilised community. The taxation of the unearned increment imparted to land by the community would reduce the selling price of land and thus remove this difficulty. It would also make rates and taxes upon houses and improvements unnecessary, and thus remove the third difficulty. In fact, it would exempt industry entirely from taxation. Finally, the increased employment of labour would advance wages. The transfer of taxation from industry to unearned increment would be of the greatest benefit to the working classes. It would make unprofitable the holding of land out of use, and would at the same time exempt improvements on land from taxation.

Dr. PANKHURST, in the discussion which followed, said the real difficulty next to the acquisition of land was to get into improved dwelling-houses the very lowest class. But he thought if they lived in a bad atmosphere because of cheapness they would surely live in a better one if they had to pay no more. If the public conscience was aroused he felt sure the economic element in the question would yield to the human.—Dr. LEWIS PARK condemned the large blocks of model buildings which were being built in London, which shut out light and air, and expressed the belief that in course of time they would be found more difficult to deal with and be more injurious to health than even the existing rookeries. What was wanted was improvements in the Building Acts so as to prevent the erection of such buildings, and also of the "jerry" structures in the suburbs.—Mrs. SHELDON AMOS, referring to Dr. Pankhurst's observations, pointed out that people of the poorer class, when they got into a clean, respectable house, were apt to destroy the fittings, and even to take down the doors &c. and burn them.—Mr. M. JUDGE deprecated too much dependence upon officialism, and thought the State should confine itself to ascertaining that the sanitary condition of every dwelling had been attended to by someone competent to advise on sanitary matters.—Mr. H. ALEXANDER, sanitary inspector of Shoreditch, thought medical officers and sanitary inspectors ought to have State protection.—Dr. ELGIN GOULD, in his reply, strongly urged the importance of

regular sanitary inspection, instead of depending on private complaint; and secondly, the registration and certification of houses.

Laws as to Noxious Gases.—Mr. A. E. FLETCHER, chief inspector under the Alkali &c. Act, read a paper on the present state of the British law relating to the discharge of noxious gases from manufacturing processes. He stated that the existing law had led to strange anomalies, owing to the constant change and development of chemical processes, and it was much to be desired that a more general Noxious Gases Regulation Act should be adopted, whereby all works where certain noxious gases were generated should be brought under its control. These noxious gases form but a short list—namely, chlorine and its acid compounds, the acid compounds of fluorine, nitrogen, and sulphur, including sulphuretted hydrogen. To these might be added metallic fumes containing lead, antimony, arsenic, or zinc. An Act for regulating all works liable to discharge any of the foregoing substances would not require amendment from time to time, as must be necessary when the specific processes of manufacture were named, since these were ever changing. Some even would think it better to make no attempt to enumerate the gases to be considered noxious, and to enact simply that in the case of every manufacturing process from which a noxious gas might be thrown off, the manufacturer should use the best practicable means for preventing the escape of such gas into the atmosphere. For the purpose of such an Act a noxious gas might be defined as "a gas which gives offence, and is the subject of complaint to the local authority on the part of ten neighbouring ratepayers."—Dr. ABBOTT (Boston, U.S.A.) stated that the laws of his State in this respect were amongst the oldest they had, dating back to 1697. The principal works they had to deal with, however, were those for the manufacture of artificial manures, and others of a similar nature.

Food Adulteration.—Dr. P. F. VAN HAMEL ROOS (Amsterdam) read a short paper on Food Adulteration and International Measures for its Prevention. He urged that international arrangements should be made for preventing such adulteration. Governments should establish a code indicating the normal composition of commercial articles in general and of food-stuffs in particular. This code should form the basis of decisions in every country on questions of adulteration. Every government should make itself acquainted with the code and with the changes which might have from time to time to be made in it.

Sale of Poisons.—Dr. G. DANFORD THOMAS, coroner for Central Middlesex, read a paper on this subject. He said he found from the report of the Registrar-General for 1889 that 15,025 persons died during that year from what were termed violent deaths, and that of this number 636 were from the effects of poison. Excluding authentic cases of suicide, there were left 376 cases of death arising from poison classified as occurring from accident or negligence. The various poisons recorded as causing these deaths were arsenic, mercury, lead, copper, lunar caustic, ammonia, caustic soda, caustic potash, phosphorus, sulphuric acid, nitric acid, hydrochloric acid, carbolic acid, carbonic acid, turpentine, paraffin, opium, laudanum, morphia, cordial soothing syrup, paregoric, chlorodyne, alcohol, chloral, atropine, belladonna, iodine, prussic acid, oil of almonds, cyanide of potassium, aconite, colchicum, strychnia, nux vomica, cocaine, antipyrin, Stedman's powders, and Burnett's disinfectant. Besides these, a few deaths were attributed to the eating of fungi, poisonous weeds and poisonous fish. Despite the regulations and precautions which to a certain extent were imposed in this country by law on the sale of poisons, the would-be suicide managed to obtain what he wanted in one way or another, and even, indeed, if effectually hindered in this method of self destruction, would readily find some other means to accomplish his object. The larger number of deaths from poisons, however, were classified as from misadventure. As far as the large majority of deaths from poison were concerned, we could obtain fairly reliable facts and statistics; but it was impossible to even estimate the large number of persons who might suffer either from acute or chronic poisoning, who might recover, or who did not die from the immediate effect of the poisonous drug. It was well-known that some of the poisons in the list he had given were contained in many of the proprietary and so-called patent medicines and nostrums which were largely sold to the public, who procured and consumed them without any knowledge of what they contained, the suggestion of a friend or some specious advertisement being the only recommendation upon which they administered to themselves these too often dangerous preparations. It was true that on analysis many of these so-called remedies were found to contain harmless ingredients; but, on the other hand, a large number of them contained what had been not inaptly termed "concealed poisons," such as morphia and the various preparations of opium, prussic acid, and other poisonous drugs, as found in chlorodyne, black drop, soothing syrups, some balsams, elixirs, and teething powders; and even in some so-called blood mixtures, arsenic; and iodide of potassium had been discovered in quantities capable of producing poisonous results. There were three Acts of Parliament regulating the sale of poisons—the Arsenic Act of 1851, and the Pharmacy Acts of 1852 and 1868. These Pharmacy Acts contained two schedules of poisons, and contained regulations as to their purchase, but there were a large number of poisons not included in the lists; and these could be purchased without restriction from anyone who liked to sell them. For example, carbolic acid, nitric acid, hydrochloric acid, sulphuric acid, and phosphorus (as rat poison) could be procured at most chandlers' and oil shops, from one pennyworth upwards, by any person of any age; and they could be sold, and often were, in any kind of vessel without any indication of any kind as to the nature of the contents. Poisons bought in this way caused a large number of the deaths classified under the headings of misadventure and suicide. Wholesale dealers were exempt from the operation of these Acts, so that any quantity of poisons could be procured through them without restriction. Besides the chemist and druggist, the chandler and oil-shop keepers who sold poisons, there were about 13,600 tradesmen in Great Britain, consisting of grocers, linendrapers, general storekeepers, and others, who were dealing in mysterious and secret medicines, many of them containing poisons the nature and property of which were absolutely unknown to the vendors. Comparatively speaking, there were few patent medicines. The composition of a really patent medicine was known, and could be seen, at the Patent Office. The proprietary medicine was a secret preparation, but both bore the Inland Revenue stamp, and were vaguely termed by the public "patent medicines." Over £200,000 was realised by the Government last year from the sale of medicine stamps, and about £6000 from licences to sell. With regard to the interference of the State, in making regulations care must be taken not to hamper the requirements of trade. As an amendment to the Pharmacy Acts, he would remove such poisons as morphia, laudanum, chloroform, nux vomica, belladonna, chloral hydrate, and corrosive sublimate from the second to the first list of poisons, and all those poisons which could be procured at the oil shops, and which he had already mentioned, should at once be placed in list No. 2, so as to ensure their being properly labelled, as directed by the Act. He would further make it compulsory that all such liquid poisons should be sold in a distinctive and coloured bottle, and that no one under the age of sixteen years should be served at all. Such regulations would inflict hardship on no one. With regard to the sale of proprietary and secret medicines containing poisonous drugs, he would have the contents clearly expressed on the label and the word "poisonous" added as required in the sale of such poisons under the present Acts. Dr. Danford Thomas pointed to the action which had been taken in Japan, Italy, France, and Germany with reference to the subject, and remarked that other nations seemed to be in advance of Great Britain as regards the precautions taken in the sale of poisons and of secret medicines. He would make all proprietary medicines really patent; he would abolish licences to sell them, and would confine the retail sale to chemists and druggists only.—Dr. LITTLEJOHN, medical officer of health, Edinburgh, stated that, as surgeon of the police of that burgh, he had chiefly to complain of the sale of opium. Nothing could be more disgraceful than the ease with which opium could be purchased. He had taken from the pockets of suicides twenty small phials containing the drug. He very cordially supported the suggestions which Dr. Danford Thomas had made for the improvement of the law in this country respecting the sale of poisons.—Brigade Surgeon MCGANN spoke of his experience in Mysore, and stated that for some years past he had advocated the necessity of doing something to restrict the sale of poisons

in India. He referred particularly to the sale of arsenic, and said he had hopes that before long something would be done. He thought it would be desirable that this Section should express some opinion upon the subject.—Mr. M. CARTEIGHE, President of the Pharmaceutical Society, expressed his cordial concurrence with the conclusions which Dr. Danford Thomas had come to. Since the passing of the present Act they had had great difficulty in carrying it out, because there had been so many ways of circumventing it. As to how far proprietary medicines containing morphia and other patent medicines should be prohibited, speaking from the point of view of an ordinary citizen, he should say that it certainly was demoralising; that while, on the one hand, pharmaceutical chemists were restricted from selling laudanum, except under certain conditions, the ordinary huckster in the street might sell any quantity of the same laudanum if it was mixed with treacle, or some other harmless material. The result of this had been that while the sale of statutory poisons as such had been diminished, the sale of quack nostrums and secret remedies containing poison had increased enormously. It was a remarkable thing that, while the Legislature was putting restrictions on alcoholic drink, another evil of a magnitude as great, if not greater, was springing up by its side. He thought the suggestions of Dr. Danford Thomas should be considered by some Government department.—A resolution, moved by Dr. DANFORD THOMAS, and seconded by Dr. LITTLEJOHN, was, after some conversation, passed in the following terms: "That in the opinion of this Section of the International Congress of Hygiene and Demography it is essential in the public interest that the existing law regulating the sale of poisons should be amended, and greater restrictions placed on the sale of poisons generally in all countries, and especially in Great Britain, India, and her colonies."

There were less than a dozen members present when the resolution was passed.

The Section then adjourned.

THURSDAY.

On Thursday Dr. F. W. Barry, Inspector of the Local Government Board, one of the vice-presidents of the Section, took the chair in the absence of the President, Lord Basing.

Burial and Cremation.—This formed the main subject of discussion in this Section.

Sir HENRY THOMPSON read a paper on recent proposals relating to burial and cremation, and the importance of disinfecting all bodies dying from infectious disease, with remarks on the present system of certifying the cause of death. He had recently proposed that everybody dying of zymotic disease should be at once absolutely disinfected and rendered incapable of extending it as soon as possible after death. He had only one mode of effecting this object—namely, by submitting the body to a sufficiently high temperature. He had said nothing relative to the employment of exposure to high temperature or cremation as a desirable process after death in all cases instead of interment in earth. But it was impossible to resist the belief that the former would be preferable from a sanitary point of view.

Mr. F. SEYMOUR HADEN read a paper in which he argued against cremation and advocated the ordinary system of burial in the earth.

A long discussion followed, in which Sir SPENCER WELLS, M. CAFFORD, and M. BROUARDEL (Paris), the Rev. F. LAWRENCE (hon. sec. of the Burial Reform Association), Dr. E. DUNCAN (representing the Scotch Burial Reform Association), Dr. FRANKLIN PARSONS, Mr. PATON BUCHAN (Glasgow), Surgeon-Major INCE, and Dr. WILLOUGHBY took part. At the close of the discussion resolutions were carried to the effect that Government should be urged to remove all legislative obstacles to the cremation of bodies, and to adopt cremation of bodies on the battlefield; and that cremation of the dead was a rational and hygienic procedure, which was especially called for where death occurred from contagious diseases.

Subsequently papers on the education, position, and duties of persons engaged in Sanitary Administration were read and discussed.

After some discussion, the following resolution was passed:—"That this meeting approves of the action of the Worshipful Company of Plumbers in improving the education and position of plumbers."

On the motion of Mr. GEORGE REID, M.O.H. (Staffordshire), seconded by Mr. H. ALEXANDER (chief sanitary inspector, Shoreditch), the following resolutions were agreed to:—"That the present conditions relative to the appointment of inspectors of nuisances are not calculated to secure the efficient administration of the Public Health and other sanitary Acts, and that reform is urgently needed in the direction of increased salaries and allowances for travelling expenses in scattered districts, greater security of tenure of office, definition of size of districts as regards area and population that might be entrusted to one officer, the production of evidence of fitness in the shape of some diploma by all candidates for such appointments, and the limitation of the duties (except perhaps in the case of very small districts) to those purely appertaining to the office." "That it is desirable to confine all appointments of inspectors of dairies, cow-sheds, milk-shops, and canal boats to inspectors of nuisances." "That a copy of the above resolutions be forwarded to the Local Government Board."

The Section then adjourned.

DIVISION II.—DEMOGRAPHY.

DEMOGRAPHY AND INDUSTRIAL HYGIENE.

WITH laudable punctuality this division commenced business only a few minutes after twelve. There were not many persons present, but some of the best known delegates and most distinguished demographers were at their posts. Mr. FRANCIS GALTON, the President, without any formalities or explanatory remarks, commenced his introductory address. It would, he said, be presumptuous to obtrude opinions at this the first stage of the proceedings. He was addressing experts, men who had collected full data of great national importance. He would therefore not speak generally, but draw attention to a few points that should be more fully investigated. The problem of the betterment of the human race was scarcely beyond the academic stage. Yet there were no limits to the possibility of what might be done or attempted, since we actually witnessed the exclusion of the Chinese race from the customary privileges of settlers in two continents, and the deportation of a Hebrew population in a third. What were the relative fertility of different classes and races, and their tendency to supplant one another under various circumstances? The whole question of fertility under the various conditions of civilised life requires more detailed research than it had yet received. Was it true that misery in any justifiable sense of that word provided the only check which acts automatically, or were other causes in existence, active, though as yet obscure, that assist in restraining the overgrowth of population? "It is certain that the productiveness of different marriages differs greatly in consequence of unexplained conditions. Information bearing on the fertility of different nations had been collected mainly in the gross. We possess little more than mean values applicable to general populations. Take, for example, a number sufficient for statistical purposes of persons occupying different strata or classes, those who are the least efficient on physical, intellectual, and moral grounds forming our lowest class, and those who are the most efficient forming our highest class. The question to be solved relates to the hereditary permanence of the several classes. What proportion of each class is descended from parents who belong to the same class, and what proportion is descended from parents who belong to each of the other classes? Do those persons who have honourably succeeded in life, and who are presumably, on the whole, the most valuable portion of our human stock, contribute on the aggregate their fair share of posterity to the next generation? If not, do they contribute more or less than their fair share, and in what degree? In other words, is the evolution of man in each particular country favourably or injuriously affected by its special form of civilisation? Enough is already known to satisfy us that the productiveness of both the extreme classes, the best and the worst, falls short of the average of the nation as a whole. Taken altogether, on any reasonable principle, are the natural gifts of the most productive class, bodily, intellectual, and moral, above or below the line of national mediocrity? If above that line, then the existing conditions are favourable to the improvement of the race. If they are below that line, they must work towards its degradation. Whatever other countries may or may not have lost,

ours," said the President, "has certainly gained on more than one occasion by the infusion of the breed of selected sub-races, especially of that of the Protestant refugees from religious persecution on the Continent. It seems reasonable to look upon the Huguenots as men who, on the whole, had inborn qualities of a distinctive kind from the majority of their countrymen, and who may, therefore, be spoken of as a subtype—that is to say, capable, when isolated, of continuing their race without its showing any strong tendency to revert to the form of the earlier type from which it was a well-defined departure. It proved also that the cross breed between them and our ancestors was a singularly successful mixture. Consequently England has been largely indebted to the natural refinement and to the solid worth of the Huguenot breed, as well as to the culture and technical knowledge that the Huguenots brought with them. The frequency in history with which one race has supplanted another over wide geographical areas is one of the most striking in the evolution of mankind. The Negro now born in the United States has much the same natural faculties as his distant cousin who is born in Africa, the effect of his transplantation being ineffective in changing his nature, but very effective in increasing his numbers, in enlarging the range of his distribution, and in destroying native American races. There are now some 8,000,000 of Negroes in lands where not one of them existed twelve generations ago, and probably not one representative of the race which he displaced remains there; on the other hand, there has been no corresponding diminution of numbers in the parent home of the Negro. Precisely the same may be said of the European races who have during the same period swarmed over the temperate regions of the globe, forming the nuclei of many future nations." Political events, he said, had contributed to bring about great results in this respect, and the question would arise whether legislation, which had led to the substitution on a large scale of one race for another, had not often been the outcome of conflicting views into which the question of race hardly entered at all, and which were so nearly balanced that if the question of race had been properly introduced into the discussion the result might not have been different. The importance to be attached to race was a question that deserved a far larger measure of exact investigation than it received. The recent attempts by many European nations to utilise Africa for their own purposes gave immediate and practical interest to inquiries that bear on the transplantation of races. They compel us to face the question as to what races should be politically aided to become hereafter the chief occupiers of that continent. He desired to point out the importance of a more exact examination and careful record than is now made of the physical qualities and hereditary antecedents of candidates for employment in tropical countries. It was desirable to judge how far medical forecast was justified by the result, and more especially to find out the conditions in youth that were prevalent among those whose health subsequently endured the change of climatic influence satisfactorily, and conversely as regards those who fail. In conclusion, Mr. Francis Galton wished to emphasise the fact that the improvement of the natural gifts of future generations of the human race was largely, though indirectly, under our control. We might not be able to originate, but we could guide. The processes of evolution were in constant and spontaneous activity, some pushing towards the bad, some towards the good. Their part was to watch for opportunities to intervene by checking the former and giving free play to the latter. He wished to distinguish clearly between our power in this fundamental respect and that which we also possess of ameliorating education and hygiene.—This paper was received with applause, and Mr. Galton rose again to explain that this, the first, was the hardest day's work Division II. had to perform. The speakers must therefore be strictly limited to time—fifteen minutes for the papers and seven for the speakers.

Death-rates in Trades.—Mr. W. OGLE, M.D., F.R.C.P., then presented a very carefully prepared paper on the proportion of death in the different trades and occupations. These facts were summarised in a series of tables and brief notes accompanying them. These figures showed that some occupations are four times more fatal than others; but metals, metal dust, and lead cause the greater number of fatalities. Sudden strain—that of the fisherman, for example,—rather than long-continued regular effort—as, for instance, that of the agriculturist,—in-door rather than out-door occupations, are the most fatal. Alcoholism was also a cause of excessive mortality, and workmen were told that they might by self-restraint at least avoid this risk; yet in many cases this was not so. The surroundings were such as to exercise as much influence, leading to drunkenness, on the individual as the bad air he was obliged to breathe or the noxious substances he was compelled to manipulate brought about the poisoning of the system. Thus we find death due to drinking much more prevalent in the liquor trade. Dr. Ogle alluded to the remarkable immunity of miners from phthisis, and suggested that this should be studied so as to apply the cause of immunity to others besides miners.

Dr. JACQUES BERTILLON gave a description of the statistics collected in Paris. Those afforded by benefit societies he considered to be wellnigh worthless so far as illness was concerned. It was so difficult to establish where illness began. A person with a headache was ill, but would receive no benefits from his society. Indeed, benefits were given not in proportion to illness, but according to the money at the disposal of the societies. English societies, being older and wealthier, showed twice the amount of illness as French societies, yet the mortality was lower in England than in France. The same might be said with respect to Italy. The census and the registration of deaths also led to many errors. A butcher might inscribe himself as a tradesman or a *négociant*, for this sounded better; and certainly he did negotiate for the purchase of meat. Still, facts sufficient had been obtained in Paris to confirm in the main all that Dr. Ogle had brought forward.—Dr. MILLIET of Berne thought demographers were divided into two great sections—the optimists and the pessimists. He belonged to the latter. He did not believe the conclusions were altogether reliable. In Switzerland, for instance, men who were in the main agriculturists appeared in the statistics as innkeepers. This also sounded better. The mountain guides worked at some craft in the winter (when the census was taken), and figured in the census as bootmakers &c. Might not coalminers pass to some other occupation in their old age before they died, and thus render the mortality of men in the coal trade apparently comparatively slight?—M. VAILLANT, member of the Paris Municipal Council, argued that in discussing illness and death according to occupations we had to take into consideration three factors: First, the morbid invasion—that is, the advent of the specific germ; secondly, the sanitary or insanitary surroundings of the individual; thirdly, the individual predisposition. Healthy people will best resist the germs they may absorb. To prevent disease it was above all necessary to build up the individual, make him constitutionally sound and strong, and improve the place where he worked. The specific germ would then be a less important consideration. But this could not be done if the worker had not enough time of rest and enough material comfort—that is to say, sufficient wages—to recoup the waste of tissue caused by his work. If the equilibrium is upset, if the recuperation is not ample, then he will not have the necessary stamina to resist. The father must have time to live a family life and take intelligent interest in the education of his children. Dr. Milliet had alluded to alcoholism; this must be viewed in connexion with the normal condition of the workman. Undoubtedly, when it was necessary to rally vital forces for a special effort alcohol was useful; this had been demonstrated in the treatment of typhoid fever. Moral depression had in a similar way been combated by the use and after by the abuse of alcohol. The solidarity of society in matters of health had been clearly proved. The breath and the dejection of the sick poor infected the wealthy. He therefore ventured to submit a resolution to the effect "That in the interests of public health, and to favour the development of the individual and the race, the duration and intensity of the day's work should be reduced as much as possible; therefore the Congress approves the efforts of the working classes to secure the Eight Hours' Day by means of international legislation."—Dr. PAUL BROUSSE, also a member of the Paris Municipal Council, at once sent up his card to the chairman signifying that he would be ready to second M. Vaillant's resolution if it could be taken; but Dr. KORÖSI of Buda-Pesth, being next inscribed to speak, diverted the discussion into another channel. He showed that there were different means of dealing with occupations. At Buda-Pesth they were put in categories

of those who worked under a high temperature in dust or in the open air. He thought the out-door workers—drivers, carpenters, bricklayers, &c—lived the longest. For dust he had chiefly in view flour mills, and there tuberculosis was not especially prevalent.—Dr. EBENEZER DUNCAN of Glasgow stated that plumbers, while often suffering from lead-poisoning, were remarkably free from the diseases especially attributed to sewer air. He insisted that micro-organisms had been proved to be less prevalent in a sewer than in a dwelling-house or a schoolroom. Zymotic diseases did not follow the line of drainage, and our notions on the dangers of sewer air would have to be considerably modified.—Dr. ARLIDGE spoke concerning the omission of linen weavers in Dr. Ogle's report. Their mortality was, he maintained, four times greater than the cotton and wool weavers and spinners.—After some remarks from Professor Broehmerf and Dr. Bach, the Chairman announced the receipt of a written communication from Dr. Paul Aubray which was not germane to the question, but which merited the thanks of the division. With regard to M. Vaillant's resolution, the Chairman did not know how to act, and proposed to refer it to the committee. M. Vaillant urged that it should be put to the vote, and it was decided that advice should be taken from the organisers of the Congress as to how resolutions were to be treated.

This ended the first set of papers put down for discussion, and by this time the attendance in the division, which had never been well attended, was remarkably scanty. With a view presumedly to get quickly through the work, no translations had been allowed, so that those who could not understand the three languages, English, German, and French, one by one, left the room, and of course the number of linguists who remained was very limited.

Dr. VON MAYR (Munich) now read in German his paper on the Insurance of the Working Classes. He urged that in nations such as Germany and Austria, where insurance was compulsory, statistics should be taken as to the nature and duration of occupation. In countries where insurance was not compulsory, facilities should be afforded by State or police regulation for the collection of such statistics. They should also include the amount of wages paid, and statistics on wages were now collected by the Bavarian State.

Mr. ROWLAND HAMILTON, F.S.S., read a long paper on Thrift, and Mr. Stephen N. Fox, one of the secretaries of the Section, read Mr. Frederick Whymper's paper setting forth what the great linendrapers had done to protect the health and morals of their female shop assistants and workers, giving a very roseate view of the situation, excepting for those who lodged in private houses, where the intense dulness of their solitary existence brought about the worst results.—Mr. DAVID SCHLOSS maintained that there was far more thrift in England than generally believed, and that employers had done more for their work-people than was thought by those who read, mainly, accounts of what had been attempted abroad. But the strength of trades unions often rendered it unnecessary for the employers to interfere.—M. GREULICH (chief of the Swiss Workmen's Secretariat) engaged in a controversy with Dr. GEORG VON MAYR about labour statistics, in which Dr. ULRIK took part.—Mr. TAIT insisted on the advantages of thrift, M. MILLIET on the unreliability of the statistics on accidents; while Mr. NEWBATT, President of the Institute of Actuaries, said that that highly competent body had come to the conclusion that the German compulsory insurance scheme was not financially sound.—The discussion being soon after exhausted, Dr. Migerka's paper on Museums of Industrial Hygiene was, in his absence, taken as read, as also the paper by Mr. B. H. Thwaite, C.E., on the Economical Advantages of Industrial Hygiene.—Señor P. G. FARIO of Barcelona, in conclusion, read an interesting paper on the Demographical Statistics of Barcelona, which showed that while the mortality of that town was equal to close on 30 per 1000, in some districts it was only 13 per 1000. The excessive death-rate arose in narrow streets, overcrowded insanitary houses, and the statistics, when subdivided according to districts and compared to the nature of the house, conclusively proved all for which hygienists contested. He therefore, with eloquence, urged that no money should be spared to make houses and towns healthy; in the long run this was the most economical, as well as the most humanitarian policy.

This last paper terminated the agenda for the day, and the division may be congratulated on having got over much ground. The advantage, however, of thus rapidly accomplishing the allotted tasks may be open to question, for what was gained in rapidity was lost in intelligibility. Also, in the absence of translations, the delegates left the meeting in the hands of so few persons that the moral influence of any decision or approbation is very much lessened.

WEDNESDAY.

At the opening of the sitting on Wednesday, Mr. FRANCIS GALTON, who again occupied the chair, explained that he had consulted with the Organising Committee as to the line of conduct to be followed with regard to the resolution. The result was that he had determined to go back upon the old French method of voting, though the French themselves are now beginning to realise that the English method is much the best, and it is the English method that has been enforced in most of the recent French Congresses. In England we generally do not allow a discussion unless a resolution is first proposed. If there is no proposal before the meeting, what is the good of discussing. In France it was the custom to discuss a subject, and then, at the end of the discussion, to frame a resolution likely to meet the views of the majority as set forth by the general tone and drift of the discussion. Mr. Francis Galton, whose too evident purpose is to burk all resolutions, proposed that these should be sent in writing, and then put, without any discussion, on the last day, and when all the business was over. But he urged that it would be proposed first only to enter the resolutions on the minute book, and not to carry them. Of course, several delegates protested. They agreed that resolutions should be sent in beforehand, but claimed that amendments might be proposed on the spur of the moment. Mr. Galton had to promise, as a compromise, to read out the resolutions each day, so that there might be time to prepare and send in amendments. This discussion, the only business discussion the division has yet held, lasted twenty-five minutes. Never has time been more usefully employed since the Section met, for it showed that there were some persons present who attended for a more serious purpose than mere speech making.

Migration of Labour.—Mr. E. G. Ravenstein read the first paper which treated the question of Temporary Migration of Labour. Among other matter he pointed out the evil arising from the want of proper accommodation for the inhabitants of the towns who during certain seasons went out into the country to pick hops or otherwise help in harvesting. Their surroundings were often so terrible that they became degraded and many consequently fell lower and lower till they became members of the vagrant class. This class was not unlike the Red Indian, equally callous in respect to discomfort and equally incapable of resisting the allurements of "fire water." This degradation of a portion of the population was all the more distressing, as it involved in a similar fate the children of these people. We ought to take better precautions to prevent hop-pickers becoming nomades. Dealing with the immigration of rural people into towns, he advocated allotments, a more laborious system of tillage, and home industries as a means of keeping people in the country. This would check overcrowding of towns, and thus benefit health. With regard to emigration, Mr. Ravenstein urged that we should see that the character of emigrants agreed with the character of the natives. Had this been done, we should have avoided the disastrous mistake of inducing Chinese to go to Australia and America.

Migration and Emigration.—A lengthy paper from M. LEVASSEUR on emigration in France was read.—Dr. MOUAT discussed the coolie question.—Dr. THOMAS V. GRIMSHAW, Registrar-General for Ireland, showed that poverty was the cause of migration, and that migration corresponded with a backward state of civilisation.—Dr. WILSON RHODES protested against the bad sanitary condition of cottages and the insufficient food of agricultural labourers. This produced ill health, reduced vitality, and was one of the main causes of migration towards large towns.—Professor R. MAYO SMITH described the difficulties of America in dealing with the immigration question. The emigrants secured a supply of cheap labour, but they destroyed the formerly homogeneous and happy life of the New England towns and homes. Were the economical advantages sufficient to compensate the social and moral loss?

The next subject of discussion related to the suitability of the Tropical Highlands for European settlement. The first paper read was by Dr. ROBERT W. FELKIN, Lecturer on

Diseases of the Tropics in the Edinburgh School of Medicine.

Climate.—Surgeon-General Sir WILLIAM MOORE read a paper setting forth that the modifications produced in the system of the European by a tropical climate are in some degree hereditary.—Mr. CLEMENT MARKHAM, C.B., said that, though we had not sufficient data to form an opinion, they must remember that in eight generations a man had 256 progenitors; how was it possible to tell if they were all pure Europeans? Such pure Europeans did, he believed, exist in Peru, where he had himself seen pedigrees going back to the sixteenth century. He thought that only mountain systems covering large areas were suitable if large and high enough. Small areas were only serviceable as sanatoria.—Professor STOCKVIS protested against the supposition so often made that anæmia prevailed in the tropics. Persons very pale and presenting other symptoms had been examined, and it was found that they possessed the normal proportion of red corpuscles in their blood. The only colonist who would implant his race was the colonist who did not wish to return. If he is homesick he will deteriorate. On the other hand, if he remained in the colony he would gradually assimilate with the native type—man is moulded by exterior influence.—Surgeon-General Dr. EWART thought that if Europeans could not work in the fields they could not be considered colonists.—Professor MIELLET said the statistics about inhabitants of Swiss mountains were unreliable.—Dr. KNAPP and Mr. BOURNE made a few remarks.—Sir RAWSON RAWSON thought that Europeans could not colonise even the highlands of the tropics, and the division, thus enlightened, closed the debate on the subject.—Mr. WHITTAKER described some charts showing that people living on chalk soil were remarkably free from cancer.

THURSDAY.

Indian Factory Legislation.—On Thursday it was decided to open the debate on this subject by reading two papers. The first, by Mr. HOLT S. HALLETT, C.E., dealt with Indian factory legislation. He explained that barely 50,000 women and children out of 10,000,000 or 12,000,000 women and children employed in industrial pursuits are brought within the scope of the recently enacted Indian Factory Act. This Act does not affect the smaller workshops, though they need legislation as much as, if not more than, the large factories.—Mr. JONES, one of Her Majesty's inspectors of factories, described unfavourably the institutions in that country.—Mr. HALLETT then depicted the awful aspect of these places, and quoted medical authority to show that young children especially should not be allowed to work under such conditions. He described how what little law does exist is easily eluded, and claimed that if legislation is necessary to protect the Lancashire operative, who is the most skilful worker in existence, it is much more required to shield the weak Indian worker. He insisted that English experience proved what a boon such legislation was to the workers. The Indian medical officials coincided as to the necessity of better Factory Acts for India. This, he maintained, would not check the development of Indian industry any more than it did English industry. In conclusion, Mr. Holt S. Hallett urged that to ensure the enactment of suitable protection for the Indian working classes, the reports of the India Factory and Sanitary Commissions that have been held, together with the evidence and all existing reports and opinions of Indian factory inspectors and health officers, should be laid before the Standing Committee on Trade and Manufactures in this country, and instructions given to that committee to draw out a comprehensive and adequate Factory and Workshop Act for our Indian Empire, in order, in the words of Lord Cross, "to secure, without fail, for the various classes of operatives in India, an amount of protection for life and limb, and an amount of security for the health of women, young persons, and children, not inferior to that which is afforded by the law of England."

Madame Dr. ALEXANDRA TKATCHEFF read the second paper, dealing with precisely the opposite side of the question—namely, home work, which in Russia, it appears, is especially encouraged. Madame Tkatcheff stated that the number of workers engaged in the domestic trades in Russia who work in their villages and during the winter months, when agricultural pursuits are not possible, amounts to 7,500,000, and the yearly value of their production is estimated at one and a half milliard roubles. They are bound to resort to those industries on account of the deficiency of their earnings in agriculture, and most of them, while carrying on various crafts, continue to cultivate their fields. All kinds of occupations are resorted to during the winter, but the textile industries are the most usual. Cabinet-making and the manufacture of all kinds of wooden ware, small iron goods, boots and shoes, felt ware, laces, &c., are also carried on during the time the snow is on the ground. The sums earned are extremely small, and constantly decrease. The economical and hygienical conditions of the workers are extremely deplorable. The Russian Government, and especially the provincial assemblies, have been compelled to take some interest in these domestic trades. In 1872 a committee was nominated by the Ministry of Finance to inquire into their condition, and the committee has already published sixteen big volumes on the subject. Its conditions are the following: (1) That it is necessary to supply the workers with raw material at cost price and with good tools; (2) to introduce perfected processes of work; (3) to supply them with models, specimens, and drawings; (4) to organise associations for the purchase of raw material and to supply them on credit at easy terms; (5) to create national workshops; (6) to organise stores for the sale of their produce in order to bring producers into direct contact with the consumers, and to find markets within Russia and abroad. Some specialists in the matter find it useful to have, moreover, annual congresses of delegates from the domestic trades and persons well acquainted both with the theory and practice of various trades. And finally, larger associations or trusts, to be formed by the various branches of the producers, are recommended. After the preliminary inquiry was terminated, some attempts were made to go from mere theory to practice. Several municipalities have organised stores and shops to sell the produce of domestic industries and opened technical schools. But in order to attain any positive results from all these studies, and in order to save the Russian nation from a general bankruptcy, which is unavoidable if the present state of affairs continues, political, economical, and social reforms are necessary. Let us hope they may come in good time. From this it will be seen that while the health of the population of most countries is affected by being driven to towns and to large factories, in Russia, on the contrary, every effort is made to keep the people in the country, and give them work in their own homes. When, however, we consider how insanitary these homes are, the advantage is not so apparent. Perhaps, on the other hand, if the measure suggested increased the earnings of the Russian peasant to a notable extent, then the necessary sanitary reforms might become more practical than they are at present.

Professor KOWALKOWSKY, of the Warsaw University, spoke on the state of factory workers in Russia. He gave statistics extending over 100,000 operatives who had been carefully examined for width of chest, height, weight, &c., and the result conclusively proved a great physical degeneration. He therefore proposed factory legislation which should extend to home workers, to adult males as well as to women and children.—Doctor BAHADHURJI, on behalf of the Bombay mill owners; Dr. HENRY COOK, who has practised fifteen years in Bombay; the Hon. NOWROJEE N. WADIA, Municipal Councillor for the town of Bombay; and Mr. ROWLAND HAMILTON, all severely criticised Mr. HOLT S. HALLETT's paper, and explained that Indian operatives worked very leisurely, and were better off than the agricultural population.—Dr. ALBERT LEFFINGWALL, an American delegate, on the contrary, declared that he had never seen more hopeless, miserable specimens of humanity.—In replying, Mr. HOLT HALLETT pleaded especially for the children who from seven years of age were made to work as long as men.

Professor BELA FÖLDES read a paper on the taking of statistics, and Dr. KÖRÖSI on the effect of the age of parents on the health of their children. This led to a very interesting discussion, and Dr. Körösi was warmly felicitated for the manner in which he had elucidated the subject by means of the statistics he had made of the population at Buda-Pesth.

The division was able to adjourn at 1 o'clock.

MEETING OF DELEGATES OF THE INDIAN GOVERNMENT.

A special meeting of the International Congress of Hygiene was held on Thursday in the theatre of the University of

London, when Surgeon-General Sir J. W. MOORE read a paper on Sanitary Progress in India. Among other signs of the improved condition of public life in India, the lecturer cited the improvement in the food supply of the people owing to the attention given to agriculture and irrigation, the more equitable distribution of the salt supply, the extension of forestry, and the advance in education, an educated person being more likely to appreciate sanitation than an uneducated one. Great endeavours had been made to obtain a reliable registration of births and deaths and an accurate census, but up to the present they had been ineffectual. The result of sanitary activity had been a reduction in small-pox and cholera, although fever had not diminished. The death-rate of European soldiers had diminished from 69 to less than 14 per 1000, and the best insurance offices would insure the lives of Europeans going out to India without exacting the extra premiums required in former years. The better educated classes were taking a greater interest in, at least, external sanitation. At the same time, he did not hesitate to say that the abolition of the Contagious Diseases Act was calculated to do more evil in India than all the sanitary measures would do good. Exception was taken to the statement that insurance policies were allowed to Anglo-Indians without the payment of an extra premium.

Surgeon-Major HENDLEY, the Government of India delegate for Rajpootana, read an excellent and very practical paper on the Sanitary State of Rajpootana and its Native Cities, such as Jeypore, and the native villages, describing the extremely insanitary conditions that prevailed in many places, especially in the native villages, and the sanitary progress that had been made and was being made. He set forth the great difficulties with which his application of sanitary measures was attended, and the caution and circumspection with which we should proceed in dealing with the natives and their rulers. A very interesting discussion followed, which was to be continued on the following day.

ANNUAL REPORT OF THE LOCAL GOVERNMENT BOARD FOR IRELAND.

FROM the nineteenth annual report which has been just issued, it appears that there has been a further decline in the average daily number of persons relieved in the workhouses, while there has also been a slight decrease in the average daily number of persons who received out-door relief. The average daily number in the workhouses was 41,793, and on out-door relief 62,235, or a total of 104,028, which was less than the average daily number relieved in and out of the workhouses in the previous year by 1794. During the year ended March 7th last the total number of deaths in the various workhouses was 11,256, showing a decrease of 321 deaths as compared with the number for the preceding year. Of these, fever caused 333, against 377; lung disease, 2211, against 2218; phthisis, 1156, against 1178; brain disease, 399; and heart disease, 630. There were for the twelve months ending Sept. 29th 55,460 admitted into the workhouses for sickness, being an increase of 3358 as compared with the previous year, a decrease of 38,609 in the number admitted who were not sick, and an increase of 452 in the number suffering from fever or other contagious disease. In the various dispensary districts the medical officers attended 411,088 new cases at the dispensaries and 188,126 persons at their own homes, or a total of 599,214, gave certificates for 1843 dangerous lunatics, and vaccinated or revaccinated 90,278 people. The vaccination returns show an increase of 1283. Small-pox was introduced into the North of Ireland last January by a sailor, and thirty-seven cases occurred in Belfast, Ballymena, and Castledawson. In the last-named place two of the cases proved fatal. The Board draws attention to the insufficiency of the protection afforded by the primary vaccinations performed upon those who took the disease. Among the thirty-seven cases of small-pox the marks of primary vaccination did not in any single instance come up to Marson's standard of good vaccination. As regards fever, there were 4285 cases attended by dispensary medical officers, being a decrease of 156; and a decrease of 579 in the cases of scarlatina treated, the numbers being 1259 and 1838 respectively. The subject of ether drinking is fully gone into by Dr. Stafford, medical inspector, who gives a history of the origin of the habit, its extent, the classes addicted, the method and dose, and the diseases arising from drinking ether. As regards the latter, there is no positive proof that any organic disease is produced by the abuse of the drug, but it is stated that there is a peculiar anæmic condition following its use in confirmed ether drinkers, also of acute and chronic gastritis—a chronic catarrhal condition of the stomach. An overdose of the drug frequently causes rapid tympanitic distension of the abdomen. It has been alleged that the abuse of the drug causes insanity; but this is not accurate, though there is reason to believe that it may give rise to diabetes. The Medical Charities expenditure amounted to £161,341, under which heading is included the cost of medicines and medical appliances, salaries of medical officers and apothecaries, vaccination fees, and other expenses, showing an increase of £3386 over that of the previous year. The Board sanctioned loans, amounting to £111,898 10*s.* 3*d.*, to various towns in Ireland, principally for sewerage and water-supply, which, added to previous sums allocated, constitute a total of £2,084,125 0*s.* 2*d.* for the past sixteen years.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN twenty-eight of the largest English towns 5216 births and 3439 deaths were registered during the week ending Aug. 8th. The annual rate of mortality in these towns, which had increased in the preceding four weeks from 16·8 to 19·6 per 1000, declined to 19·1 last week. The rate was 20·3 in London and 18·0 in the twenty-seven provincial towns. During the past five weeks of the current quarter the death-rate in the twenty-eight towns averaged 18·4 per 1000, and was considerably below the mean rate in the corresponding periods of the ten years 1881–90. The lowest rates in these towns last week were 12·1 in Derby, 13·6 in Bristol, 14·0 in Portsmouth, and 14·4 in Bradford and in Cardiff; the highest rates were 21·4 in Newcastle-upon-Tyne, 21·5 in Sunderland, 22·7 in Wolverhampton, and 30·9 in Preston. The deaths referred to the principal zymotic diseases, which had increased in the preceding four weeks from 310 to 653, declined again last week to 622; they included 417 from diarrhœa, 68 from whooping-cough, 61 from measles, 33 from diphtheria, 22 from "fever" (principally enteric), 20 from scarlet fever, and one from small-pox. No death from any of these diseases was recorded in Brighton; in the other towns they caused the lowest death-rates in Bolton, Portsmouth, Huddersfield, and Cardiff, and the highest rates in Leeds, Leicester, Sunderland, and Preston. The greatest mortality from measles occurred in Derby and Sunderland; and from diarrhœa in Hull, Sunderland, Wolverhampton, London, Leeds, Leicester, and Preston. The mortality from scarlet fever, whooping-cough, and "fever" showed no marked excess in any of the twenty-eight large towns. The 33 fatal cases of diphtheria included 24 in London, 2 in Leicester, 2 in Nottingham, and 2 in Salford. One death from small-pox was registered in Leeds, but not one in any other of the twenty-eight towns; and no small-pox patients were under treatment either in the Metropolitan Asylum Hospitals or in the Highgate Small-pox Hospital on Saturday last. The number of scarlet fever patients in the Metropolitan Asylum Hospitals and in the London Fever Hospital at the end of the week was 920, against numbers increasing from 857 to 899 at the end of the preceding four weeks; the patients admitted during the week were 74, against 98 and 121 in the previous two weeks. The deaths referred to diseases of the respiratory organs in London, which had declined in the preceding three weeks from 189 to 173, rose again last week to 191, and were slightly above the corrected average. The causes of 60, or 1·7 per cent., of the deaths in the twenty-eight towns were not certified either by a registered medical practitioner or by a coroner. All the causes of death were duly certified in Bristol, Sunderland, Cardiff, and in four other smaller towns; the largest proportions of uncertified deaths were recorded in Liverpool, Bradford, Sheffield, and Brighton.

HEALTH OF SCOTCH TOWNS.

The annual rate of mortality in the eight Scotch towns, which had declined in the preceding three weeks from

18·9 to 16·9 per 1000, further fell to 15·9 during the week ending Aug. 8th, and was 3·2 below the mean rate that prevailed during the same period in the twenty-eight large English towns. The rates in the eight Scotch towns ranged from 8·9 in Leith and 10·6 in Aberdeen to 18·0 in Greenock and 19·3 in Glasgow. The 410 deaths in these towns showed a decline of 26 from the number in the preceding week, and included 19 which were referred to diarrhœa, 14 to whooping-cough, 7 to measles, 5 to scarlet fever, 3 to diphtheria, 2 to "fever," and not one to small-pox. In all 50 deaths resulted from these principal zymotic diseases, against 47 and 61 in the preceding two weeks. These 50 deaths were equal to an annual rate of 1·9 per 1000, which was 1·5 below the mean rate from the same diseases in the twenty-eight English towns. The fatal cases of diarrhœa, which had been 12 and 21 in the preceding two weeks, declined to 19 last week, of which 9 occurred in Glasgow and 6 in Dundee. The 14 deaths referred to whooping-cough showed a decline of 3 from the number in the previous week, and included 8 in Glasgow and 3 in Dundee. The 7 fatal cases of measles exceeded the numbers in recent weeks, and included 6 in Glasgow. The deaths from scarlet fever, which had been 6 and 3 in the preceding two weeks, rose again to 5 last week, all of which were recorded in Glasgow, where the 3 fatal cases of diphtheria were also registered. The deaths referred to diseases of the respiratory organs in these towns, which had been 80 and 65 in the preceding two weeks, further declined last week to 60, and were slightly below the number in the corresponding week of last year. The causes of 26, or more than 6 per cent., of the deaths in the eight towns last week were not certified.

HEALTH OF DUBLIN.

The death-rate in Dublin, which had been 21·2 and 18·3 per 1000 in the preceding two weeks, further declined to 16·5 during the week ending Aug. 8th. During the past five weeks of the current quarter the death-rate in the city averaged 18·2 per 1000, the rate for the same period being 18·5 in London and 15·2 in Edinburgh. The 113 deaths in Dublin during the week under notice showed a decline of 12 from the number in the preceding week, and included 4 which were referred to whooping-cough, 1 to "fever," 1 to diarrhœa, but not one either to small-pox, measles, scarlet fever, or diphtheria. In all, 6 deaths resulted from these principal zymotic diseases, equal to an annual rate of 0·9 per 1000, the zymotic death-rate during the same period being 4·3 in London and 0·4 in Edinburgh. The fatal cases of whooping-cough, which had been 3 and 4 in the preceding two weeks, were again 4 last week. The death referred to "fever" was certified as a case of enteric fever. The 113 deaths in Dublin last week included 18 of infants under one year of age and 27 of persons aged upwards of sixty years; the deaths of infants showed a further decline from those recorded in recent weeks, while those of elderly persons slightly exceeded the number in the preceding week. Two inquest cases and 2 deaths from violence were registered during the week, and 44, or more than a third, of the deaths occurred in public institutions. The causes of 10, or nearly 9 per cent., of the deaths in the city were not certified.

THE SERVICES.

ARMY MEDICAL STAFF.—Brigade Surgeon Sidney Keyworth Ray, F.R.C.S. Edin., is placed on retired pay (dated July 31st, 1891); Surgeon-Major Robert De Burgh Riordan is placed on retired pay (dated July 26th, 1891).

MEDICAL STAFF CORPS.—The annual mess dinner of the Volunteer Medical Staff took place last week at the Holborn Restaurant. There was a large attendance of medical officers representing every branch of the Volunteer Force. Sir Thos. Crawford, K.C.B., occupied the chair. The Chairman, on proposing the toast of the "Medical Services," alluded to the changes in the organisation and development which had already been effected in the Volunteer Medical Service, and expressed a hope that further progress in the same direction might be made at an early date, and that the extension to the members of the Volunteer Medical Staff of the terms of the new warrant, now daily expected, might satisfy the legitimate aspirations of the Medical Services, and of the profession. Other toasts followed and were responded to, and the entertainment terminated.

VOLUNTEER CORPS.—*Rifle:* 1st Volunteer Battalion, the Buffs (East Kent Regiment): Acting Surgeon Richd. Bevan to be Surgeon (dated Aug. 8th, 1891).—4th Volunteer Battalion, the Norfolk Regiment: Honorary Assistant Surgeon F. Clowes resigns his commission (dated Aug. 8th, 1891).

VOLUNTEER MEDICAL STAFF CORPS.—The Manchester Division: John James Kent Fairclough, M.D., to be Acting Surgeon (dated August 8th, 1891).—The Aberdeen Division: The undermentioned Acting Surgeons to be Surgeons:—Alex. McGregor, M.D., James Mackenzie Booth, M.D., and John Scott Riddell, M.B. (all dated Aug. 8th, 1891).

Correspondence.

"Audi alteram partem."

THE ALBERT UNIVERSITY AND THE COLLEGE OF SURGEONS.

To the Editors of THE LANCET.

SIRS,—I am afraid that even you do not fully appreciate the hardships under which the provincial medical schools now labour, especially those not favoured with any university connexion; nor do you see, as I do, how completely such a school as ours would have been ruined had the Royal Colleges had their way in the proposed new University. At present the Court of Examiners of the College is constituted wholly of London surgeons, and this has practically been the case up till now. The fact that one of our best known provincial surgeons was nominated at the recent meeting of the Council and got *only one vote* is sufficient to show that there is no immediate intention of changing this policy.

I maintain that in the ranks of provincial surgeons there are at least twenty men as skilled in the principles and practice of surgery, as competent to practise them and to examine candidates for surgical honours, as any of the present Court of Examiners. With matters as they are, what would have happened if the Royal Colleges had become the licensing body for the new university? The present conjoint examinations would have been made at once the graduation examinations and those for licences to practise, and the two Colleges—the College of Surgeons certainly—would have closed their doors to any but academic claimants. But all such are required to be resident in London for two years, and the inevitable result for us would have been that what students we could have retained would have had to go to Edinburgh and Dublin for their licences to practise. You express a belief that a Midland University might be formed, and might offer a share of its government to the College of Surgeons, as was proposed in the new University; but I know the style of the College of Surgeons sufficiently well to know that they would have accepted no such position. Had the Colleges obtained the powers in the new University for which they made claim, they would have heavily handicapped the Scotch Universities, and particularly the University of Durham and the Victoria. Dr. Collins' resolution was therefore in no way hostile to mine—in fact, I repeatedly protested against its being treated as an amendment, and finally I succeeded.

The introduction of the "but" welded the two resolutions into one, and the conclusion of both was an expression of intense satisfaction that even if the Royal Colleges should accept the position offered them in the new University, the "official" teeth were drawn, so far as doing mischief is concerned. It is pleasant to look back on the struggle of the last two years and see that the humble country folk have checkmated the astute metropolitans at every move on the board, and that the new parochial university is left stranded and helpless—helpless unless it will go on its knees and ask aid from the despised and rejected Apothecaries. Verily, the stone which the builders rejected is likely to become the chief corner stone.

Finally, is it not time that the tyrannous majority accepted the overtures that have been made to them many

times? It is perfectly impossible to permit matters to go on as they are. The discontented minority are not yet strong enough to eject those in power, but they are and have been strong enough to spoil the game at every turn, and they are determined enough to continue their efforts indefinitely. I am, Sirs, yours truly,

Birmingham, Aug. 7th, 1891. LAWSON TAIT.

DISCUSSION UPON ANÆSTHETICS AT BOURNEMOUTH.

To the Editors of THE LANCET.

SIRS,—You will perhaps permit me to point out some inaccuracies in your report of the above. I was asked to open the discussion, which I accordingly did, taking up the clinical side of the question. The valuable communications of Dr. Lauder Brunton and Drs. Gaskell and Shore dealt wholly with the experimental as opposed to the clinical side of anæsthetics. I can only correct errors of commission in the report of my own remarks; those of omission, although seriously affecting the force of the thread of argument, are, I have no doubt, necessitated by want of space. I was speaking not from personal experience, but from published reports of dangers and difficulties under anæsthetics, and stated (1) persons in health died under chloroform, but in no case had a death, to my knowledge, occurred in a healthy person whilst under ether; (2) children and parturient women do die under chloroform. Comparing these statements with your report, you will see it represents me as having said the direct converse, and, further, with contradicting myself.

I am, Sirs, yours obediently,

Mortimer-st., W., Aug. 11th, 1891. DUDLEY W. BUXTON.

ALCOHOL AND LONGEVITY.

To the Editors of THE LANCET.

SIRS,—I did not intend troubling you with any further observations on this subject, since I have already stated in your columns, under a full sense of public responsibility, that your suggested explanation of the effect of the transfers upon the mortality of their respective sections was not well based. I made this declaration after having had the opportunity of yearly studying the inner working for over seventeen years, as well as after an exhaustive investigation into the mortality experience of the entire institution from its commencement down to a recent period. This being the case, I preferred to leave the question to the judgment of the medical profession; but as some of my friends are desirous that you should not be left under any misapprehension, any more than you would wish it yourselves, I ask you to allow me to add that, if you consider that the whole or any important number of those transferred from the abstaining to the general section have dropped by death, it will be sufficient to state that out of the 470 transfers from the abstaining to the general section, the mortality rate has been about ·94 per cent. per annum; and out of the 725 transfers from the general to the abstaining section, the rate has been about 1·16 per cent. per annum.

There are further abundant grounds, the minutiæ of which I will not intrude upon you, that justify me in repeating that the effect either way is barely noticeable, either statistically or financially.

I am not without hope that I shall enlist the support of a journal of the scientific standing of that of THE LANCET, and of that large body of the great profession of medicine of whose views it is the exponent, for a cause that has both public morals and the private well-being of the human race for its end. I am, Sirs, your obedient servant,

RALPH P. HARDY.

Norfolk House, Victoria Embankment, W.C., Aug. 7th, 1891.

HUMAN OR ANIMAL LYMPH?

To the Editors of THE LANCET.

SIRS,—I have seldom read a more thoroughly practical description of the great differences between human and animal lymph, and one in which I entirely agree, than that contained in the annotation at page 305 of THE LANCET of Aug. 8th, 1891. The vaccinator who cannot withdraw vaccine lymph from a ripe, uninjured vesicle without incurring "the risks which arise from this puncture," in my humble opinion has a great deal to learn; and the vaccinator who does not scientifically use even the crust from a case of calf-lymph vaccination is, in my opinion, guilty of most reprehensible neglect in wasting valuable lymph. I use the word "scientifically" advisedly, for that method of scraping the eruption on the abdomen of a wretched calf and making it up into a kind of pomade is quite as unscientific as, though less successful than, the Hindu inoculator who pounds up the crusts with treacle and flour, and pastes it over an abraded surface at the base of the right thumb in males and the left in females! The vaccinator who applies clamps to the base of the eruption on the abdomen of a calf knows as little about vaccination practically as the one who, after he has taken all the lymph that flows spontaneously from a scientifically punctured vesicle, presses out with his fingers *a great quantity of serum* and *a very little true lymph*; while the vaccine dealer, who sells a little lymph in a tube for one shilling and a great deal in the same sized tube for one and sixpence, is as ignorant of the method of scientifically filling and closing tubes as the one who boils the lymph in sealing up the tube! Had Sheffield been vaccinated by arm-to-arm vaccination instead of so much vaccination from stored lymph, we should never have known of such an outbreak of small-pox, and the world never heard of such an attempt to bolster up a system of wholesale spurious vaccination, or rather irritation. The greatest enemy which vaccination has to contend against, and which is really the cause of the present Royal Commission on Vaccination, is the appalling ignorance of the subject from a purely practical point of view. Your space is valuable, so I will not ask for more of it, than to thank you again for the clearness with which a most important subject is placed before your numerous readers.

I am, Sirs, yours faithfully,

ROBT. PRINGLE, M.D. Edin.,

Blackheath, S.E., Aug. 1891. Brigade Surgeon, H.M. Bengal Army.

NORTHERN COUNTIES NOTES.

(FROM OUR OWN CORRESPONDENT.)

Newcastle Royal Infirmary.

THE question of rebuilding or removing the Royal Infirmary from its present site has been under consideration for some time, for in its present condition it is admitted on all hands to be inadequate to the demands made for accommodation, and, indeed, it is also behindhand as to modern requirements. The result of a late discussion made it very clear that the medical staff, while anxious for the enlargement and alteration of the building, did not wish it removed from its present site. So that upon the whole the erection of a new wing finds most favour with the governors, and a motion has been carried for a committee to report at an early meeting upon the best manner of attaining this object.

New Home for Incurables.

The committee of the Newcastle Corporation have reported that the plans of the proposed new home for incurables have been presented to the Charity Commissioners, who require alterations which will cost £500. The committee recommended that the increased expenditure, bringing the total cost for the home to £15,500, be agreed to.

Tyne Port Sanitary Authority.

The report of the work of the Tyne Port Sanitary Authority for June and July states that 2362 vessels had been visited. There had been twenty-nine cases of sickness on board ship. The report of Dr. H Armstrong showed that several persons had been admitted to the floating hospital, and one had died from enteric fever.

Sunderland.

The ninety-second annual report of the Sunderland and Bishopwearmouth Infirmary states that the number of patients who received treatment during the past year was 4860, being an increase of 278 over the preceding year. The number of in-patients was 2159, an increase of 286, and the number of out-patients 2701, a decrease of 8, as compared with the previous year. Of the in-patients, 1257 were surgical cases (including 374 accidents of a serious nature), and 902 were medical cases. The total income

was £10,352, against £8465 in 1890. The working classes had contributed £4540, and the places of worship £800. The working-men governors had collected £236.

Darlington.

The report of the medical officer of health for the last quarter shows that Darlington has passed through a severe epidemic of measles. Dr. Laverence states that there have been over 500 cases, with fifteen deaths. Influenza has been prevalent. There have been only three deaths certified from it, but its debilitating effects have been the cause of increasing the death-rate in other ways.

South Shields.

The report of the Ingham Infirmary, South Shields, shows that the total number of patients treated during the past year was 6193, the expenditure resulted in a balance to credit on the year's working of £93, and the capital account a credit balance of £304. The committee reported that the interest taken in the affairs of the institution by working men had been fully maintained, as evidenced by their contributions, which had this year amounted to the handsome sum of £651, being an increase on last year of £35. It was resolved that any body of men subscribing £10 and upwards should be entitled to have a representative governor for each £10 subscribed, who should be entitled to vote at all general meetings of governors during that year.

Deafness as a Cause of Incompetency in a Sea Captain.

I see that some correspondents have been writing to THE LANCET as to deafness being a cause of incompetency at sea. It may interest them to know that a case has been tried by the South Shields Local Marine Board, by order of the Board of Trade, in which a captain's certificate has been suspended for deafness as long as he should suffer from the malady. This is stated to be the first case in which a captain's certificate has been suspended for deafness.

Death of Mr. J. T. Mackay.

Intelligence has been received in Sunderland of the sudden death, while on his holiday in Scotland, of Mr. J. T. Mackay, a well-known Sunderland surgeon. Mr. Mackay was about forty-seven years of age, and had been a practitioner in Sunderland for many years.

It is announced that Dr. Thomas Oliver of this city has been appointed Examiner in Physiology in the University of Glasgow.

Newcastle-on-Tyne, August 12th.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

The Twenty-second Annual Meeting of the German Anthropological Society.

AT the annual meeting of the German Anthropological Society the other day, Professor Waldeyer of Berlin, in continuation of his recent communication to the Royal Prussian Academy of Sciences on the so-called island of Reil and Sylvian fissure in the gibbon, described the corresponding phenomena in the orang, the gorilla, and the chimpanzee. The island convolutions show a gradual development in these apes, progressing in this order: gibbon, orang, gorilla, and chimpanzee. Though the fundamental form of the island is the same in man as in the anthropoid apes, there is a notable difference in the furrow; the number of the convolutions is greater in man, especially the lower or temporal lobe of the island, which is free from convolutions, or shows at most faint traces of them, in the anthropoids, but which has three or four distinct convolutions in man. A case of hereditary dwarfishness was shown by Dr. Lissauer of Dantzic, in the person of a girl of ten, who has inherited the dwarfish stature of her father, while her younger sister, a child of four, who is already considerably bigger, has inherited the normal stature of the mother. Professor Ranke of Munich spoke on the relation of the skull to the brain in the lower animals and in man, and sought to prove that the development of the brain in point of size is of decisive influence on the form of the skull. The more largely developed the brain, the more are the frontal parts of the skull pressed forward, and the prognathism or snout-formation of the lower animals yields to the nobler form of the human face. Dr. Mies of Berlin showed a new apparatus for the exact measurement of the skull.

Birthdays of Virchow and Helmholtz.

With the permission of the rector of the University, a Students' Committee has been formed with a view to celebrating the birthdays of Virchow and Helmholtz, both of whom attain the age of seventy this year—Helmholtz on the 31st inst., and Virchow on Oct. 13th. This committee has issued an invitation to the students to take part in a banquet (*Commers*), to be held for the above purpose on Nov. 7th.

The fiftieth anniversary of the graduation of the famous chemist Professor August Wilhelm von Hofmann was celebrated yesterday.

Dr. Leverin Robinski is about to publish a work on the treatment of cancer, based on thirty years' studies and observations.

Dr. de Ruyter has established himself as a private lecturer on surgery in Berlin University.

Professor Bernhard Fischer has been appointed to fill the new chair of hygiene in the University of Kiel, and to be director of the Hygienic Institute there.

Professor Loeffler of Greifswald has been appointed to the chair of hygiene at Marburg, vacant by Professor Rubner's appointment to succeed Koch in Berlin.

Berlin, Aug. 10th.

Obituary.

JOHN SLOANE, M.D. EDIN.

DR. JOHN SLOANE died on Saturday night last at his residence in Welford-road, Leicester. The deceased gentleman had been suffering from an internal disease for the past three or four years, but he had been able to continue his medical duties until a fortnight ago. Dr. Sloane's first medical appointment was at Nottingham, where he was house surgeon to the infirmary for three years. He went to Leicester in 1854, and for five years held a similar appointment at the Leicester Infirmary. In the latter end of 1859 he commenced private practice, which ultimately became a very large one. He sat on the town council for nine years, and through his instrumentality a separate sanitary committee was appointed.

EDMUND OVERMAN DAY, M.R.C.S., L.S.A.

THE untimely death of Mr. Day removes a very well known figure from the ranks of general practitioners in the south of London. Although he had attained only to the age of thirty-nine years, Mr. Day had established a very large practice in Waterloo-road, where he was first resident medical officer, and afterwards honorary surgeon, to the Royal Hospital for Women and Children. His record was in many respects a very remarkable one, although the demands of an enormous number of patients, belonging chiefly to the industrial and small tradesman classes of the community, made it impossible for him to take any prominent place among the scientific investigators of disease. In practical knowledge of his profession he was, however, well and widely versed, and he enjoyed throughout a large circle a high reputation for skill in the treatment of the diseases of children. His hospital practice also gave him an extensive acquaintance with the diseases of women, and in these two departments he enjoyed much more than a merely local reputation. His personal popularity was, however, by no means limited by the good opinion which his neighbours and patients had formed of his professional capacity, but rested in no less measure upon his genial temper, and frank and kindly manners. He was indeed a man eminently gifted by nature to win and to retain the affection of those with whom he was brought into contact. No one ever greeted a new face with more unaffected *bonhomie*, and no one ever stood more staunchly by his old friends. Open-hearted, unsuspicious, and outspoken, he was, nevertheless, a shrewd man of business; and this rare combination of qualities undoubtedly contributed much to the success which so promptly and so constantly attended him through his short career. His death was tragically sudden. He had arrived at his surgery, as was his wont, early in the morning of the 4th inst., and had proceeded to his private room to prepare for his morning round. Not appearing with his customary promptitude, he was sought by his servant, who found him

in a fainting fit, from which he never recovered, dying within a few minutes of the arrival of his assistant at his side. Death was attributed to failure of the heart's action, and by its unexpected suddenness produced a most painful shock throughout the circle of his friends. The corpse was interred in the family grave at Flamstead, Herts, on Monday, the 10th inst.

Medical News.

ROYAL COLLEGES OF PHYSICIANS AND SURGEONS OF EDINBURGH AND FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—**At the July sittings of the Examiners, held in Glasgow, the following candidates have passed the respective examinations:—**

First Examination.—Of 47 candidates entered the following 28 passed:—Alfred E. J. Ward, India; Hugh Mackay, Glasgow; Lydia Ann Lesney, Sussex; John F. Wm. Ward, India; Marion Gilchrist, Bothwell; Alice L. L. Cumming, Renfrewshire; Marion C. Horner, Co. Derry; Flora A. Holt, Yorkshire; William H. Penrose, Cork; Elizabeth D. Lyness, Co. Antrim; George Gibson, Co. Cork; Thomas William Smyth, Co. Cork; Charlotte R. Hodgins, Co. Tipperary; Margaret C. Dewar, Ceylon; Amy C. Dewar, Ceylon; John H. Holmes, Llandiloes; Luke J. Quigley, King's County; Janet M. Kay, Castle-Douglas; David Walker, Glasgow; Anthony S. Rose, Morpeth; Joseph Tibbitts Kinver, Staff.; Wm L. Norwood, Ireland; Wm. A. Reidy, Ireland; Ebenezer Allan, Scotland; Charles Peddie, Scotland; David Dinwoodie, Scotland; William Watson, Scotland; Chas. E. Moody, Scotland.

Second Examination.—Of 59 candidates entered, the following 28 passed:—George J. Willis, Queen's County; James J. Fanning, Co. Tipperary; Joseph F. Campbell, Athlone; John Russell, Aberdeenshire; George E. Macleod, India; David Stephen, Co. Down; William D. Anderson, London; William Owen, Carnarvon; Patrick J. O'Keeffe, Cork; John P. Roberts, Ruthin; Wm. C. Paterson, Wetherby; John Livingston, Glasgow; Lachlan Burges, Banffshire; John C. Lynd, Limavady; Percy T. Tolputt, Folkestone; Samuel M'Nair, Co. Antrim; Henry W. Stewart, Co. Tyrone; Henry R. Wolfe, Glasgow; Cuthbert Rutherford, Northumberland; James C. Hamilton, Co. Tyrone; Patrick J. Murphy, Cork; William R. Thomson, Australia; Chas. R. Huxley, Kent; Herbert P. Weston, Manchester; Barclay Wiggins, Ayrshire; Albert Edward Downey, Glasgow; Wm. C. Alexander, Glasgow; John Clark, Glasgow.

Final Examinations.—Of 56 candidates entered, the following 18 passed and were admitted licentiates of the three Colleges:—John C. Ferguson, Edgehill, Forres; Maurice Gepp, Chelmsford; Henry B. Ord, Darlington; David M'Crorie, Glasgow; Patrick Mackin, Glasgow; Francis Edward Williams, Edinburgh; Marshall Sutton, M.D., Edinburgh; William A. Gosford, Liverpool; Murdo Murchison, Edinburgh; John Lamont, Partick; Herbert Part, Wigan; Henry A. Holmes, Manchester; Thos. L. Wilson, Glasgow; Grace Ross Cadell, Edinburgh; Thomas G. Carr, Preston; James Wardrop, Glasgow; Wm. G. Scarth, Leeds; Joseph B. H. Beatty, London.

UNIVERSITY OF ABERDEEN.—**The following candidates have received degrees in Medicine and Surgery on July 29th:—**

Degree of M.D.—A. S. Inglis, M.B., C.M., Hastings; A. Nicoll, M.B., C.M., Queensland; P. J. S. Nicoll, M.B., C.M., Ashton-under-Lyne.

Degrees of M.B. and C.M.—J. Ambrose, Aberdeen; *A. Anderson, M.A., Edenkillie; C. A. Barron, Nairn; R. H. G. Bruce, New Deer; J. D. Burnett, Fraserburgh; E. H. Condon, India; J. S. Cooper, New Machar; S. Couper, Aberdeen; J. G. Dallas, Nairn; *W. J. Dewar, Arbroath; W. Dunn, Tyrone; *H. Fraser, M.A., Ross-shire; A. Gardiner, Devonshire; A. Jamieson, Ellon; J. Laird, Crathie; D. Lamond, M.A., Crathie; *J. R. Levack, Aberdeen; J. Leys, M.A., Crathie; F. P. Maclennan, Lochcarron; *E. C. Maguire, Aberdeen; J. S. Mather, Friockheim; J. Miller, Wick; *J. E. Milne, M.A., Aberdeen; *W. J. Morton, N.S. Wales; B. W. Mudd, Sussex; H. O. Nicholson, Aberdeen; G. Ogg, M.A., Newcastle-on-Tyne; W. Paterson, Banchory; T. W. Philip, M.A., Skene; E. G. S. Saunders, Devonshire; *W. T. Scott, M.A., Fyvie; G. Skeen, Aberdeen; G. M'I. C. Smith, M.A., Durham; E. R. Turner, Sutherlandshire; J. Walker, Stromness; J. D. Walker, New Pitsligo; R. H. Welsh, Cape Colony; G. Wilson, M.A., Strichen; J. S. Williamson, Auchmill. (J. A. Gilchrist, Banchory, and J. Mowat, Auchnagatt, have passed the Examinations for the Degrees of M.B. and C.M., but will not graduate until they attain the necessary age.)

* Honourable distinction.

The John Murray Medal and Scholarship (awarded to the most distinguished Graduate of the year) and the George Thompson Fellowship have been awarded to W. Findlay, M.A.

Diploma in Public Health.—W. H. Hewlett, M.B., C.M., Gloucester; P. B. H. M'Leod, M.B., C.M., New Deer; I. K. Reid, M.D., British Guiana.

Degree of Bachelor of Science.—J. Macdonald, M.A.

The following candidates have completed the First Bachelor of Science Examination:—A. T. Gage, M.A.; P. Mackessack.

The following candidates have passed the *First Division* of the First Professional Examination for the Degrees of M.B. and C.M.:—

J. H. Abrahams, J. M. Andrew, A. Archibald, E. Barnes, H. Barraclough, J. A. Black, T. I. Bonner, J. H. I. Brown, G. Bruce, R. F. Campbell, W. Cartwright, A. L. Cobban, C. G. Cowie, R. Cruden, A. B. Cruickshank, A. Don, W. E. G. Duthie, G. A. Gibb, J. A. Gordon, G. Grant, G. C. Grant, P. Grant, L. J. Helmrich, W. C. Hossack, J. G. Jones, W. M. Keith, A. D. Kelly, J. S. Laing, V. van Langenberg, W. Lethbridge, C. E. B. G. Lindsay, A. H. Lister, A. Low, P. Macdonald, J. M. H. MacLeod, J. Macpherson, J. S. Marr, P. Mitchell, E. Oliphant, C. E. F. Owen-Snow, A. F. Paterson, E. M. Payne, P. Prebble, A. Reid, G. Reid, D. Ross, J. H. Rowe, A. P. Rust, J. L. Salmond, R. Smith, G. Thomson, W. Thomson, G. A. Troup, R. Turner, W. S. O. Waring.

The following candidates have completed the First Professional Examination:—

J. W. S. Attygalle, G. G. M'L. Black, G. W. Brown, G. A. Bruce, A. S. Cardno, L. Cartwright, A. T. Clarke, H. G. L. Coates, L. O. Crosswell, J. C. T. Crowden, J. B. Cruickshank, D. H. Dantra, J. L. Dickie, F. P. Elliot, J. L. G. Gillanders, J. H. Goodliffe, P. Harper, H. G. Hoad, R. Johnstone, C. E. Maguire, J. Mansie, E. Proudlove, A. W. Reid, J. Russell, J. Smith, †A. Stables, J. G. Stuart, R. S. Trotter.

The following candidates have passed the Second Professional Examination:—

A. Anderson, A. Baxter, W. Boddie, J. Broomhead, A. Brown, J. Cameron, D. Crichton, N. B. Darabsheth, A. Davidson, C. M'B. Dawson, W. C. Duthie, R. Ferguson, D. Finlayson, A. Forbes, G. Fowler, †J. Gillespie, W. Grant, E. M. Griffith, A. Innes, W. A. Justice, T. B. Law, J. Leach, J. R. May, J. E. Milne, H. M'C. Mitchell, W. Moir, †T. W. Ogilvie, M. Polson, J. Ritchie, W. A. G. Russell, B. Saunders, W. H. de Silva, C. Simpson, W. Sinclair, A. W. Thomson, †W. Trethowan.

† Indicates that the candidate has passed "with credit."

THE KENT AND CANTERBURY HOSPITAL.—**The Dean of Canterbury announces that a donation of £1000 has been offered in aid of the fund for liquidating the debt on this charity on the condition that the subscription list is increased by £200.**

PRESENTATION.—**Mr. G. H. Davis, L.R.C.P. Edin., M.R.C.S., of Mortimer, Berkshire, has been presented by the inhabitants of that town and the adjacent districts on his leaving Mortimer, owing to ill-health, with a purse containing £140, and a framed address, as tokens of esteem and regard, and of sympathy in his affliction.**

APOTHECARIES' HALL OF IRELAND.—**At the annual meeting convened by the Statute of Incorporation held on the 1st inst., the following were elected office-bearers for the ensuing year:—Governor: R. G. O'Flaherty. Deputy Governor: P. C. Baxter. Directors: H. Auchinleck, Thomas Collins, John Evans, Robert Montgomery, Robert J. Montgomery, Charles F. Moore, Michael J. Moore, Edward O'Neill, Sir George B. Owens, J.P., John Ryan, James Shaw, Charles R. Tichborne, and George Wyse. Representative on the General Medical Council: Thomas Collins. Consulting Chemist: C. R. Tichborne.**

A NEW COTTAGE HOSPITAL, BROMSGROVE.—**The Lord-Lieutenant of Worcestershire last week formally opened this institution. A cottage hospital has been in existence in the town for the past fourteen years, but the lease having expired, and more commodious and improved accommodation needed, a new site in the New Road was acquired, upon which the present structure, on the pavilion system, is erected. The total cost of the building and furniture was estimated at about £4200, and although liberal support had been received, there was a deficit of £845. Mr. and Mrs. Chavasse, of Birmingham, had endowed a ward, to be known as the "Arthur Ryland Ward," as a recognition of their relative's keen interest in the foundation of the hospital in its initial stage.**

CAPPING DAY IN EDINBURGH.—**The 1st of August being Capping Day of the Edinburgh University was a bright day in the annals of 226 of its *alumni*, who on that day received their degrees in Medicine: 184 were capped M.B, and 42 graduated as M.D., among whom the following received the coveted Gold Thesis Medals:—Ed. William Wace Carlier, for his thesis on "A Contribution to our Knowledge of Hibernation, and a Description of the Minute Anatomy of the Hedgehog, with the Changes which occur during Winter Sleep"; Vaughan Harley, "Pancreatic Diabetes: a Clinical and Experimental Inquiry into its Nature, Causation, and Treatment"; David Hepburn, "The Anatomy of the Muscles and Nerves of the Extremities of the Anthropoid Apes"; Alex. Miles, "On Head Injuries: a Clinical and Pathological Study"; James Ritchie, "Cystic Disease of the Kidney"; Geo. Neil Stewart, "The Influence of Temperature and Endocardiac Pressure on the Action of the Vagus and Sympathetic Nerves on the Batrachian Heart"; John Clarence Webster, "Tubo-peritoneal Ectopic Gestation."**

OBSTETRICAL SOCIETY OF LONDON.—The Library of this Society will be closed from August 24th till September 24th

THE ALVARENGA PRIZE for 1891, of the College of Physicians of Philadelphia, has been awarded to Dr. L. Duncan Bulkley of New York, for his Essay on "Syphilis Insontium."

CHALMERS' HOSPITAL, BANFF.—On the afternoon of the 5th inst., the Duke and H.R.H. the Duchess of Fife, accompanied by Miss Forbes, of Newe, and General Macdonnell, paid a visit to this hospital, which is open to patients from the whole of Banffshire. They were received by Mrs. Gray, the matron, and conducted through the several wards. The Duke and Duchess conversed freely with both patients and nurses, and expressed much satisfaction with all the arrangements. They were greatly interested in the Koch cure, with which several cases had been treated in the hospital. Her Royal Highness has sent to Mrs. Gray photographs of herself and the Duke.

LEWIS DISPENSARY AND INFIRMARY.—This institution may be said to be in a fairly satisfactory position. The annual report for the past year shows that the income was not quite equal to the expenditure, but more patients had been treated and the benefits bestowed consequently larger. The directors were anxious to enable in-patients to have free tickets, and they thought the time had arrived when they must ask for a Hospital Sunday. As to the free ticket system, a resolution has been adopted for an alteration in the rules, that in future annual subscribers of three guineas receive one in-patients' letter, in addition to other advantages, and that donors of five guineas be accorded a like privilege.

THE BRITISH ASSOCIATION.—At the meeting of the British Association to be held at Cardiff next week the proceedings in the Biological Section promise to be of rather more than ordinary interest. For example, Dr. Sydney Hickson will open a discussion on the position in the biological scale of certain organisms which are regarded by some naturalists as animals and by others as plants. Also a paper is promised by the President, Mr. Francis Darwin, on the Artificial Production of Rhythm in Plants; one by Professor Hartog on Problems connected with Reproduction and Cell Division; another by Professor Krause, of Göttingen, on Anatomical Nomenclature; whilst other questions of scarcely less interest will be brought before the Section.

Appointments.

Successful applicants for Vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward it to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week for publication in the next number.*

BROCK, ERNEST H., M.B., M.S. Lond., has been appointed House Physician to the Hospital for Women, Soho square.

CALTHROP, GORDON, M.B., B.C.Cantab., has been appointed House Physician to the Great Northern Central Hospital, Holloway-road.

DOUGALL, JOHN, M.D., C.M., F.F.P.S. Glasg., has been appointed Physician to the Royal Hospital, Glasgow.

FORBES, ROBT. T., M.B., C.M. Glasg., has been appointed Medical Officer of the Workhouse, Sharnlow.

HARRIS, H. E., M.B. Camb., L.R.C.P., M.R.C.S., has been appointed Medical Superintendent of the St. Saviour's Infirmary, Dulwich.

LANCASHIRE, G. H., M.R.C.S., L.R.C.P. Lond., has been appointed House Surgeon to the General Infirmary, Wrexham.

LANG, HUGH, M.B., C.M. Glasg., has been appointed House Surgeon to the Royal Infirmary, Dundee, vice W. F. Farquharson, resigned.

MACEWEN, WM., M.D., C.M., F.F.P.S. Glasg., has been reappointed Surgeon to the Glasgow Royal Hospital.

MARTIN, J. H., M.R.C.S., has been appointed Medical Officer and Public Vaccinator for Wistow, in the St. Ives Union.

M'KINSTRY, W. H., M.B., C.M. Glasg., has been appointed District Medical Officer of the Walsall Union.

MORTON, ALEX., M.D., C.M. Glasg., has been appointed Physician for Skin Diseases, Glasgow Royal Infirmary, vice Provan.

PARSON, WILLIAM, M.R.C.S., has been reappointed Medical Officer of Health for the Borough of Godalming.

PARROTT, THOMAS GODFREY, L.R.C.P. Lond., M.R.C.S., has been appointed Medical Officer to the Aylesbury Union Workhouse, and Medical Officer and Public Vaccinator to the No. 3 District of the Union.

PENROSE, FRANCIS GEORGE, M.D., M.R.C.P., has been appointed Assistant Physician to the Hospital for Sick Children, Great Ormond-street.

POGSON, W., F.R.C.S., has been reappointed Medical Officer of Health for the Leeds Rural Sanitary District.

POPE, H. SHARLAND, M.A., M.B., B.C. Cantab., has been appointed Resident Medical Officer at the Royal Chest Hospital, City-road, E.C., vice Ernest H. Brock.

POTTS, R. M., L.R.C.P., L.R.C.S. Irel., has been appointed Medical Officer, *pro tem.*, of the Forkhill Dispensary District, Armagh, vice McDowell, deceased.

SAMWAYS, D. W., M.B., B.C. Cantab., has been appointed Assistant House Physician to Guy's Hospital.

SCOTT, JOHN R., L.R.C.P. Lond., M.R.C.S., has been appointed Medical Officer for the Clipsham Sanitary District of the Stamford Union, vice Sugden, resigned.

SENHOUSE, L. S., M.B., C.M. Edin., has been appointed Senior House Surgeon to the Ingham Infirmary, South Shields.

SHEPHEARD, J., L.R.C.P. Lond., M.R.C.S., has been appointed Medical Officer for the Southrepps Sanitary District of the Erpingham Union, vice Shepheard, deceased.

STODDART, Mr., has been reappointed Public Analyst for the City of Salisbury.

TEMPLETON, PERCY, M.R.C.S., L.R.C.P., has been appointed House Surgeon to the Great Northern Central Hospital, Holloway-road.

WELDON, C. CARTER, M.D. Lond., M.R.C.S., has been appointed Senior House Surgeon to the Royal Albert Edward Infirmary and Dispensary, Wigan, vice H. Birkenhead, resigned.

WILLIAMS, H. L., L.R.C.P. Edin., M.R.C.S., has been appointed Medical Officer for the Sixth Sanitary District of the Lincoln Union, vice Bolton, resigned.

WINTER, W. H. T., L.K.Q.C.P. Irel., M.R.C.S., has been appointed Honorary Surgeon to the Wolverhampton and Staffordshire General Hospital.

WRIDE, F. G., L.K.Q.C.P. Irel., M.R.C.S., has been appointed Medical Officer for the Fourth District and Workhouse of the Highworth and Swindon Union, vice Fernie, deceased.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement.

AMPTHILL UNION RURAL SANITARY AUTHORITY.—Medical Officer of Health for the District of the Union for one year. Salary £52 10s per annum, which will include all travelling and other expenses. (Apply to Mr. John Wright, Ampthill, Beds.)

CHORLTON UNION.—Second Assistant to the Resident Medical Officer of the Workhouse Hospitals, Whitington. Salary £100 per annum, with furnished apartments and attendance (but not rations) in the Workhouse. (Apply to Mr. Bloomfield, Union Offices, All Saint's, Manchester.)

HUDDERSFIELD INFIRMARY.—Junior House Surgeon. Salary £40 per annum, with board, lodging, and washing.

INDIGO PLANTERS OF SARUN, BENGAL.—A Doctor, qualified. Funds now subscribed amount approximately to Rs. 7000 per annum, and other practice amounting to an additional Rs. 3000 per annum will also probably be available. (Apply in the first instance to Messrs. Grindlay & Co., 55, Parliament-street, London.)

MANCHESTER ROYAL INFIRMARY.—Resident Surgical Officer for twelve months. Salary £150 per annum, with board and residence.

MIDHURST UNION, Sussex.—Medical Officer for the Rogate District. Salary £65 per annum, exclusive of fees for surgical and midwifery cases, which have amounted to about £15 per annum.

MUNICIPAL COMMISSIONERS OF SINGAPORE.—Health Officer, and to act as Medical Officer to the staff and employés of the Municipality. Salary Rs. 300 per mensem, with Rs. 40 extra allowance for two horses. Appointment for three years, with option of renewal; passage paid out and home. (Apply to Dr. W. Gilmore Ellis, of Singapore (now in England), at St. Bartholomew's Hospital, London, up to August 31st, or to Mr. C. C. Lindsay, 167, St. Vincent-street, Glasgow.)

PAROCHIAL BOARD OF WALLS, SANDNESS, PAPASTOUR, AND FOULA, SHETLAND.—Medical Officer and Public Vaccinator. Salary £35, exclusive of medicine.

ROTHERHAM HOSPITAL.—Resident House Surgeon. Salary £100 per annum, with board, furnished apartments, and washing.

ROYAL VICTORIA HOSPITAL, Bournemouth.—House Surgeon and Secretary for not less than two years. Salary £100 per annum, with board.

ROYAL PORTSMOUTH, PORTSEA, AND GOSPORT HOSPITAL.—Assistant House Surgeon for one year. Board and residence provided.

STOCKPORT INFIRMARY.—House Surgeon. Salary £100 per annum, with board and apartments.

Births, Marriages, and Deaths.

BIRTHS.

BONAR.—On July 30th, at Gwêl Marten, Probus, Cornwall, the wife of Dr. T. M. Bonar, of a son.

CLARKE.—On July 31st, at Lamberhurst, Kent, the wife of Fincastle G. B. Clarke, M.D., of a son.

FOWLER.—On July 24th, at Trevor Lodge, Thornton-heath, the wife of C. Owen Fowler, M.D., of a daughter.

HARPER.—On Aug. 8th, at 25, Rosary-gardens, South Kensington, the wife of James Harper, M.D., of a son.

JOHNSON.—On Aug. 7th, at 7, Den Crescent, Teignmouth, Devonshire, the wife of George Herbert Johnson, M.R.C.S., L.R.C.P. Edin., of a son.

KEEFER.—On July 19th, at The Lawn, Galt, Canada, the wife of Surgeon-Major W. Napier Keefer, Bengal Army, Retired, of a son.

MACKENZIE.—On Aug. 1st, at Henleighs, Kingston-hill, the wife of Surgeon-Major A. W. Mackenzie, 3rd Sikhs, of a daughter.
POCOCK.—On Aug. 6th, at Manor View, High-street, Streatham, the wife of Alfred G. C. Pocock, M.R.C.S., L.R.C.P., of a son.

MARRIAGES.

BERRY—FORMAN.—On Aug. 10th, at St. John's Church, Wigan, by the Rev. F. Bond, S.J., Wm. Berry, J.P., F.R.G.S.L., to Catherine, elder surviving daughter of the late Wm. Foreman, Esq., M.D., Wigan.
BULLOCK—NELSON.—On July 29th, at Christ's Church, Ealing, Roger Bullock, M.R.C.S., L.S.A., eldest son of T. W. Bullock, Esq., M.R.C.S., L.S.A., of Warwick, to Ethel, only daughter of E. M. Nelson, Esq., J.P., of Ealing and Warwick.
BURTON-BROWN—MARSHALL.—On Aug. 5th, at Shillingstone, Dorset, Fredk. Hewlett Burton-Brown, M.A., M.B.Oxon., Indian Medical Service, eldest son of Dr. Burton-Brown, C.I.E., to Ethel Ann, elder daughter of the Rev. C. J. Marshall, Rector of Shillingstone, formerly of Bengeo, Herts.
CRUICKSHANK—ROBERTS.—On Aug. 5th, at the Episcopal Church, St. Andrew's, N.B., by the Rev. Canon Tuttiett, assisted by the Rev. Lawrence Tuttiett, John David, son of the late John Cruickshank, of Sydney, N.S.W., to Katharine Edina, fifth daughter of Professor Roberts, D.D., of St. Andrew's University.
DREW—SIMPSON.—On Aug. 5th, at St. Stephen's, Castle Bar, by the Rev. B. Seymour Tupholme, Arthur John Drew, F.R.C.S.Eng., of Oxford, to Mary, eldest daughter of Thomas Simpson, Esq., of Fennymere, Ealing.
KELLY—CARRINGTON.—On Aug 6th, at Ratby, Leicestershire, Thomas Gordon Kelly, M.D., eldest son of the late Miles Kelly, of Kingstown, to Emily A., eldest daughter of the late William Carrington, of Croxden Abbey, Staffordshire.
LODGE—GARBUTT.—On July 30th, at Christ Church, Dunston, by the Rev. J. Jones, Samuel Lodge, M.D., son of Dr. Lodge, of Winnish House, Bradford, to Winifred Durham, second daughter of Wm. Garbutt, Dunston Lodge, Gateshead.
PATTERSON—PILLEY.—On Aug. 6th, at St. Giles's Church, Camberwell, Charles Sumner Patterson, M.B., C.M., M.R.C.S., son of the late John Patterson, J.P., of Liverpool, to Rhoda, eldest daughter of H. Lindley Pilley, Esq., of Southampton-street, Camberwell.

DEATHS.

BELL.—On Aug. 9th, at Harmony House, Morningside, Edinburgh, Chas. Bell, M.D.Glasg., F.R.C.P., L.R.C.S.Edin., aged 86.
DAVIES.—On July 31st, at Hatton-garden, E.C., Thomas George David Davies, M.R.C.S., L.R.C.P.Edin., &c., aged 73.
DAY.—On Aug. 4th, 1891, at 78, Waterloo-bridge-road, of syncope, Edmund Overman Day, Assistant Surgeon to the Royal Hospital for Children and Women, aged thirty-nine years. Interred at Flamstead, Herts, on Aug. 10th, 1891.
HUDSON.—On Aug. 10th, at Marine Villa, Seaforth, Liverpool, suddenly, Alexander Robert Hudson, M.B., M.R.C.S., Brigade Surgeon.
KAY.—On Aug. 9th, at his residence, Darley House, Sydenham, John William Kay, M.D.
MACKAY.—On Aug. 10th, at Moulin Pitlochry, suddenly, John Tait Mackay, L.R.C.S.Edin., of North Bridge-street, Sunderland.
MANCOR.—On Aug. 12th, at Camberwell-road, S.E., Alexander Faithfull Mancor, M.B., C.M., eldest surviving son of the late Lieutenant-Colonel Mancor, 48th (Northamptonshire Regiment), aged 42.
MITCHELL.—On Aug. 8th, at Brock street, Bath, Alexander Mitchell, M.D., late of Elmbank-place, Glasgow.
RODEN.—On Aug. 7th, at Droitwich, Worcestershire, S. S. Roden, M.D. Edin., F.R.C.S., M.R.C.S., aged 64.
SANDERSON.—On Aug. 6th, at Brighton, Hugh James Sanderson, M.D., of Upper Berkeley-street, W., aged 70.
SLOANE.—On Aug. 8th, at his residence, Welford-road, Leicester, John Sloane, M.D.Edin., L.R.C.S.Edin., L.S.A.Lond., aged 61.
STANLEY.—On July 29th, at Euyas Harold, Herefordshire, W. H. R. Stanley, M.D.Dub., L.K.Q.C.P., L.R.C.S., aged 37.
VINEN.—On Aug. 6th, at Church-row, St. John's, Southwark, James Northcote Vinen, M.D., aged 75.
WOOD.—On Aug. 5th, at West Lawn, New Romney, Benjamin Wood, M.R.C.S., aged 83.

N.B.—A fee of 5s. is charged for the Insertion of Notices of Births, Marriages, and Deaths.

BOOKS ETC. RECEIVED.

BURT, G. M., St. Mary-street, Weymouth.
The Tourist's Guide to the Isle of Portland. By G. H. Lilley, M.D. Second Edition. 1890. pp. 49.

BOAS & HESSE, Berlin.
Medicinisches Taschenwörterbuch der Deutschen, Englischen und Französischen Sprache. Von Dr. Med. E. Lehfeldt. 1891. pp. 378.

CHAPMAN & HALL, London.
Fresh Light on the Dynamic Action and Ponderosity of Matter. By "Waterdale." 1891. pp. 208.

CHURCHILL, J. & A., New Burlington-street, London.
The Pharmacopœias of Twenty-nine of the London Hospitals. By Peter Squire. Sixth Edition. 1891. pp. 332.
Prichard and Symonds in especial Relation to Mental Science, with Chapters on Moral Insanity. By D. Hack Tuke, M.D., LL.D. 1891. pp. 116.
Denmark: its Medical Organisation, Hygiene, and Demography; published with Subvention of the Danish Government. With Illustrations and Maps. 1891. pp. 474.
Statistical Investigations concerning the Imbeciles (Idiots and Feeble-minded) in Denmark, 1888-1889. By J. Carlsen, M.D. 1891. pp. 77.

CORNISH BROTHERS, Birmingham.
Contributions to Practical Medicine. By Sir James Sawyer, M.D. Lond., F.R.C.P. Second Edition. 1891. pp. 201.

HANKINSON, T. J., Victoria Library, Bournemouth.
Hankinson's New Descriptive Guide to Bournemouth, Christchurch, Wimborne, &c. Edited by C. Holland, F.S.L.A. Tenth Edition. Illustrated. 1891. pp. 112.

HIRSCHWALD, AUGUST, Berlin.
Lehrbuch der Organischen Chemie für Mediciner. Von Dr. T. Weyl. Mit 11 Holzschnitten. 1891. pp. 587.

LONGMANS, GREEN, & CO., London.
Epidemic Influenza: Notes on its Origin and Method of Spread. By R. Sisley, M.D. 1891. pp. 150. Price 7s. 6d.

LEWIS, H. K., Gower-street, London.
Handbook of Diseases of the Ear; for the use of Students and Practitioners. By U. Pritchard, M.D. Edin., F.R.C.S. Eng. Second Edition. Illustrated. 1891. pp. 238.
Differences in the Organisation of Man and Woman, Physiological and Pathological. By H. Campbell, M.D., B.S. Lond. 1891. pp. 383.

MATHIESON & SONS, Copthall-avenue, Old Broad-street, London.
The Statutory Trust Investment Guide; with an Introduction. By Richd. Marrack, Barrister-at-Law. 1891. pp. 216.

PENTLAND, YOUNG J., Edinburgh and London.
Diseases of the Skin. By W. A. Jamieson, M.D., F.R.C.P. Edin. Third Edition. With Woodcut and Coloured Illustrations. 1891. pp. 641.

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METROPOLITAN ASYLUMS BOARD.

Return of Patients remaining in the several Fever Hospitals of the Board at Midnight on August 11th, 1891.

Hospital.	Beds occupied.						Total accommodation.
	Scarlet fever.	Diphtheria.	Typhus fever.	Enteric fever.	Other diseases.	Total.	
Eastern Hospital	162	46	1	61	..	270	442
North-Western Hospital	124	32	..	26	1	183	443
Western "	120	18	..	8	3	149	224
South-Western "	142	16	..	11	1	170	340
South-Eastern "	174	6	2	10	1	193	462
Northern "	177	30	..	11	..	218	480
Totals	899	148	3	127	6	1183	2391

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Aug. 13th, 1891.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Dry Bulb.	Wet Bulb.	Solar Radia in Vacuo.	Maximum Temp. Shade.	Min. Temp	Rainfall.	Remarks at 8.30 A.M.
Aug. 7	30·13	N.W.	59	53	100	69	51	·01	Cloudy
,, 8	30·16	W.	62	55	119	76	52	..	Cloudy
,, 9	29·96	W.	60	58	73	63	57	·02	Cloudy
,, 10	29·82	W.	62	58	117	71	56	·05	Cloudy
,, 11	30·05	W.	61	57	110	71	54	·08	Hazy
,, 12	29·81	W.	62	60	110	75	59	·07	Raining
,, 13	30·00	W.	63	57	122	75	57	·01	Bright

Medical Diary for the ensuing Week.

Monday, August 17.

ST. BARTHOLOMEW'S HOSPITAL.—Operations, 1.30 P.M., and on Tuesday, Wednesday, Friday, and Saturday at the same hour.
ROYAL LONDON OPHTHALMIC HOSPITAL, MOORFIELDS.—Operations daily at 10 A.M.
ROYAL WESTMINSTER OPHTHALMIC HOSPITAL.—Operations, 1.30 P.M., and each day at the same hour.
CHELSEA HOSPITAL FOR WOMEN.—Operations, 2.30 P.M.; Thursday, 2.30.
HOSPITAL FOR WOMEN, SOHO-SQUARE.—Operations, 2 P.M., and on Thursday at the same hour.
METROPOLITAN FREE HOSPITAL.—Operations, 2 P.M.
ROYAL ORTHOPÆDIC HOSPITAL.—Operations, 2 P.M.
CENTRAL LONDON OPHTHALMIC HOSPITAL.—Operations, 2 P.M., and each day in the week at the same hour.
UNIVERSITY COLLEGE HOSPITAL.—Ear and Throat Department, 9 A.M.; Thursday, 9 A.M.

Tuesday, August 18.

KING'S COLLEGE HOSPITAL.—Operations, 2 P.M.; Fridays and Saturdays at the same hour.
GUY'S HOSPITAL.—Operations, 1.30 P.M., and on Friday at same hour. Ophthalmic Operations on Monday at 1.30 and Thursday at 2 P.M.
ST. THOMAS'S HOSPITAL.—Ophthalmic operations, 4 P.M.; Friday, 2 P.M
ST. MARK'S HOSPITAL.—Operations, 2 P.M.
CANCER HOSPITAL, BROMPTON.—Operations, 2 P.M.; Saturday, 2 P.M.
WESTMINSTER HOSPITAL.—Operations, 2 P.M.
WEST LONDON HOSPITAL.—Operations, 2.30 P.M.
ST. MARY'S HOSPITAL.—Operations, 1.30 P.M. Consultations, Monday 2.30 P.M. Skin Department, Monday and Thursday, 9.30 A.M. Throat Department, Tuesdays and Fridays, 1.30 P.M. Electrotherapeutics, same day, 2 P.M.

Wednesday, August 19.

NATIONAL ORTHOPÆDIC HOSPITAL.—Operations, 10 A.M.
MIDDLESEX HOSPITAL.—Operations, 1 P.M. Operations by the Obstetric Physicians on Thursdays at 2 P.M.
CHARING-CROSS HOSPITAL.—Operations, 3 P.M., and on Thursday and Friday at the same hour.
ST. THOMAS'S HOSPITAL.—Operations, 1.30 P.M.; Saturday, same hour.
LONDON HOSPITAL.—Operations, 2 P.M. Thursday & Saturday, same hour.
ST. PETER'S HOSPITAL, COVENT-GARDEN.—Operations, 2 P.M.
SAMARITAN FREE HOSPITAL FOR WOMEN AND CHILDREN.—Operations 2.30 P.M.
GREAT NORTHERN CENTRAL HOSPITAL.—Operations, 2 P.M.
UNIVERSITY COLLEGE HOSPITAL.—Operations, 1.30 P.M.; Skin Department, 1.45 P.M.; Saturday, 9.15 A.M.
ROYAL FREE HOSPITAL.—Operations, 2 P.M., and on Saturday.
CHILDREN'S HOSPITAL, GREAT ORMOND-STREET.—Operations, 9.30 A.M. Surgical Visits on Wednesday and Saturday at 9.15 A.M.

Thursday, August 20.

ST. GEORGE'S HOSPITAL.—Operations, 1 P.M. Surgical Consultations, Wednesday, 1.30 P.M. Ophthalmic Operations, Friday, 1.30 P.M.
UNIVERSITY COLLEGE HOSPITAL.—Operations, 2 P.M.; Ear and Throat Departments, 9 A.M.

Friday, August 21.

ROYAL SOUTH LONDON OPHTHALMIC HOSPITAL.—Operations, 2 P.M.

Saturday, August 22.

MIDDLESEX HOSPITAL.—Operations, 2 P.M.
UNIVERSITY COLLEGE HOSPITAL.—Operations, 2 P.M.; and Skin Department, 9.15 A.M.

Notes, Short Comments, & Answers to Correspondents.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this Office.

All communications relating to the editorial business of the journal must be addressed "To the Editors."

Lectures, original articles, and reports should be written on one side only of the paper.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers, not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET *to be addressed "To the Publisher."*

We cannot undertake to return MSS. not used.

SOURCES OF INFECTION.

A CORRESPONDENT who signs himself *Ubique* sends us the following hints, which, though for the most part not novel, yet in their collective form may be useful:—

"1. Giving out clothing for finishing to out-door workpeople. This is a common practice, and from this source no doubt infection is carried to the Colonies. Since the Notification of Diseases Act has come in force people, knowing that the medical attendant must certify, do not avail themselves of his services until the last resource. Consequently the first we see in many cases is desquamation or anasarca. 2. American bazaars or rummage sales, where people are invited to send all the rubbish they have at their disposal; consequently dead people's clothing and bedding find eager purchasers at a low rate, and hangings that have been in use find a ready sale. Kind but thoughtless people may do much harm by being charitable. Another source of danger to lying-in women is that of the loan of such things as waterproof sheeting, binders, and syringes. It is a very common practice. Dirty vaccination shields cast off by others have caused erysipelas. A good waterproof sheeting is that made of pitch paper covered with very thin calico; it costs but little, and can be burnt daily and fresh supplied. This paper is used by laundresses for protecting linen during conveyance."

THE COURTESY OF HOSPITAL PHYSICIANS AND SURGEONS.

Surgeon, R.N.—We are sure our correspondent's experience is a rare one. Dyspepsia in physicians and in patients counts for much, and gives colour to persons and things. But the courtesy of the physicians and surgeons of London hospitals is a matter of common remark. So also is the kindness of London consultants to their brethren in sickness, often shown at great cost of time and money, and under conditions of strain and ailment which make it wonderful.

Dr. A. Carpenter.—The unusual demand on our space this week prevents our notice of this important case; but we hope to refer to it in our next number.

WILL *Anxious Inquirer* kindly repeat his question, as his former letter has been mislaid.

V. W. should consult his usual medical attendant.

THE QUALIFICATION OF RESIDENCE AT THE ALBERT UNIVERSITY.

To the Editors of THE LANCET.

SIRS,—I have recently taken the double qualification of the Royal Colleges in London, and I went through the whole curriculum at St. Bartholomew's. Will my residence be sufficient, or shall I have to do the two years to qualify for the examinations of the Albert University?

Believe me, Sirs, yours truly,

Aug. 8th, 1891. J. H. P. G.

*** It is impossible to answer this question until the regulations are framed. This reply also answers our correspondent *Barrington*.—ED. L.

MISSION LIFE IN THIBET.

INTELLIGENCE has been received by the Edinburgh Medical Missionary Society of the death of a former student, Dr. Marx, which took place on May 29th, at his station, Leh, Ladok, from influenza, followed by double pneumonia. It appears that all the members of the Mission were one after the other stricken down with the fell disease, that during Mrs. Marx's illness she was prematurely confined, and that before Mr. Redslob (Dr. Marx's clerical colleague) became ill he was the only one to wait on Mrs. Marx in her hour of peril, and to make the coffin for her husband and infant of two days old, who were both buried in one grave. Such a glimpse of domestic missionary life in one of the lonely outposts of the mission field will, we feel sure, draw forth the sympathy of many friends on behalf of the stricken and mourning survivors, and especially for the doubly bereaved widow and fatherless children.

Dr. J. Francis Porter.—Our correspondent's charges are quite reasonable for the attendance. If the patient in the circumstances demurs to them, our correspondent's course is to adhere to them with dignity. We do not care to see medicines figure in an account.

POLLOCK AND BELLAMY MEMORIAL FUND.

Third List.

J. Augustus Lea ..	..	£5	5	0	G. H. Charlesworth ..	£1	1	0
John Marriott (second subscription) ..	..	3	3	0	Cecil R. C. Lyster ..	1	1	0
Geo. Hewlett Bailey	..	2	2	0	T. Henry Green ..	1	1	0
J. Watt Black ..	..	2	2	0	J. B. Baker	1	1	0
Sir Joseph Fayrer ..	..	2	0	0	Frederic Hewitt ..	1	1	0
H. R. Morse ..	..	1	1	0	Woodhouse Braine ..	1	1	0
C. F. Clarke ..	..	1	1	0	W. A. S. Bridgeford ..	1	1	0
James Couldrey ..	..	1	1	0	F. A. Shaw	1	1	0
Reginald Bayley ..	..	1	1	0		£28	5	0
E. Seton Pattison ..	..	1	1	0				

With smaller sums, raising the total to £150 13*s.*

134, Harley-street, W. STANLEY BOYD, Treasurer.

"THE CANARY ISLANDS FOR INVALIDS."

To the Editors of THE LANCET.

SIRS,—In answer to the letters in your issue of the 1st inst. from Dr. Alfonso and Dr. Thurstan, commenting upon my letter of July 25th, I beg to reply in the words of Pontius Pilate, *ὃ ἔγραψα ἔγραψα*. I neither wish to elicit from Dr. Alfonso what he means by a "convenient regimen," nor to comment further upon the fact of Dr. Thurstan's jumping to the conclusion that only the infectious case (measles) occurred because no others happened to come under his care. These gentlemen do not object to my remarks particularising Grand Canary, but only when I use the words "Canary Group," which, of course, includes Teneriffe. Since writing my first letter on this subject I hear from Canary that an English gentleman and his wife are both down with small-pox, showing it is still prevalent there. In conclusion, I only say that if I can prevent any invalids going to these much overrated islands I shall be only too glad to put up with the abuse I am bound to have hurled at me. All I have mentioned as to the epidemics in Grand Canary still remains uncontradicted, and I defy anybody to contradict it with truth. I am, Sirs, yours truly,

Salgrave, Banbury, Aug. 1st, 1891. E. J. FERNANDEZ.

THE RED CROSS IN FRANCE.

THE Swiss journals comment severely on the ignorance betrayed by judicial authorities in France as to the prescriptive rights of the Red Cross. At Troyes, it appears, the civil tribunal had before it a "procès de presse," turning on the fact that a society of relief for the wounded calling itself "L'Association des Dames Françaises" had claimed the right to take the title and the badge of the Red Cross. The presiding judge ruled that "from the Geneva Convention it results that the said title and said badge belong to all societies having for their object the relief of the wounded in time of war." This assertion, say our Swiss contemporaries, is quite without warrant. The Geneva Convention, as a reference to its constitution will show, is absolutely silent as to that "qui concerne les sociétés de secours," and the French judge, it is maintained, cannot have read the constitution referred to.

MEDICAL LEGISLATION AT THE CAPE.

IN a letter to the *Cape Argus* a correspondent, over the signature "Medicus," argues strongly in favour of those who have been some time in practice, and without qualification, being still required to satisfy the Medical Council. He gives instances to support his contention. At the same time, he admits that some are quite fit for recognition, and maintains that the Medical Council could soon satisfy itself as to the merits of individual cases.

Mr. A. Douglas.—Probably the Dean of any of the Swiss universities would reply to a request for information.

BOY-SUICIDE IN GERMANY.

WE have from time to time commented on the ghastly statistics supplied from Germany as to the frequency of boy-suicide in the Fatherland; and now from Vienna we have details of a criminal trial in which a schoolboy of thirteen figures as the last victim to the mania of self-murder. Langer is his name, and one day a few weeks ago he left a companion in the street, before his uncle's house, while he ran upstairs to the third storey, and then and there mounted on the window-sill and hurled himself head foremost to the pavement below. Wonderful to say, he was picked up still alive and conveyed to the hospital, where, under treatment, he began to get round. In periodical accessions of fever, however, he was heard to pronounce with terror the name of a schoolfellow, who turned out to be no other than the boy whom he had left waiting for him in the street just before precipitating himself from the window. Suspicion was aroused, and on inquiry it came out in the evidence of two other boys of the school that Langer and the above-mentioned companion (Pötzel by name) stood in the relation of serf to master, and that the latter had so completely terrorised his victim as to make him his go-between in theft. With a skill implying almost a superhuman precocity in crime Pötzel had first made Langer commit breaches of school regulations, and then, under threat of denouncing him, had got him to abstract money from his (Langer's) uncle's bureau. This went on, till at length poor Langer, with tears and supplications, told his tormentor that no more money was to be had, and besought him to cease importuning him for further supplies. Pötzel, according to the evidence, only laughed at his victim's protestations and entreaties, and even bragged to others of the schoolboys how much he could still get out of him. It was after a series of brutal threats on Pötzel's part that poor little Langer was prevailed upon to go to his uncle's house and make another raid on the bureau, leaving Pötzel waiting in the street for the plunder. Then it was, as we have seen, that the wretched boy tried to destroy himself. At the trial which ensued Pötzel betrayed the coolest, most impudent behaviour, and confessed his crime without the smallest compunction. Being not yet fourteen, he cannot (as the Public Prosecutor stated) be punished for more than a juvenile misdemeanour. Meanwhile the trial stands adjourned till Langer is well enough to appear in the witness-box.

Trebly Qualified.—The holder of the qualification mentioned is registered; but he is not fully qualified. He might find it difficult to recover charges for attendance in a *medical* case. He cannot with any accuracy or propriety style himself "Dr."

THE SKIN OF THE TOAD.

To the Editors of THE LANCET.

SIRS,—In THE LANCET of Aug. 8th (p. 312) Dr. Lauder Brunton is reported to have said that "the skin of the toad has been found to act like digitalis." Is the similarity of action such as to confirm the ancient belief in the poisonous properties of this animal? Many expressions of this belief occur in ancient literature. Juvenal, for instance, twice refers to the criminal use of the toad:

> "Occurrit matrona potens, quæ molle Calenum
> Porrectura viro miscet sitiente rubetam."—*Sat. i.*, 69.
>
> "At nunc res agitur tenui pulmone rubetæ."—*Sat. vi.*, 659.

Some time ago I consulted Paris and Fonblanque's Medical Jurisprudence, and found they rejected this opinion, which they believed to have originated in the frequency with which the toad was used in magical rites. They did, I think, refer also to the local irritant effect of the skin secretion. Perhaps someone will oblige me with more recent knowledge. I am, Sirs, yours truly,

Edinburgh, Aug. 10th, 1891. FRED. S. GENNEY, M.B., C.M.

FALSE BITTER ALMONDS.

ONE of the last new products of the inventive genius of the adulteration-monger is the artificial bitter almond. The false seeds are composed chiefly of grape sugar, with an extremely small quantity of nitrobenzole, which gives them the flavour of oil of bitter almonds. They are pressed in a mould, which causes their external appearance to resemble natural almonds so well that when a number of the false seeds are mixed with the true ones the deception is exceedingly difficult to detect by mere inspection. Of course the former can be obtained at a ridiculously low price, and consequently the adulteration must be very profitable.

T. S. H.—It is not unusual for an assistant or a locum tenens to receive half inquest and midwifery fees; but clearly he could not legally claim such without a special agreement.

ERRATUM.—In Dr. Barrs' paper, published last week, page 287, line 14 from the bottom, for "recto-peritoneal hernia" read *retro*-peritoneal hernia.

COMMUNICATIONS not noticed in our present number will receive attention in our next.

COMMUNICATIONS, LETTERS, &c., have been received from—Prof. Attfield, London; Mr. Angus, York; Mr. Byerley, Gosport; Messrs. Blondeau et Cie., London; Mr. Birchall, Liverpool; Messrs. Bochringer and Sohne; Mr. Barbour, London; Miss Bidwell; Messrs. J. Beal and Son, Brighton; Mr. Brew, Malvern; Dr. Barrs, Leeds; Mr. Brierley, Cardiff; Mr. J. Brown, London; Mr. Brewer, Ulverstone; Dr. Tyrrell Brooks, Oxford; Mr. Bourchier, Brighton; Mr. Brown, Westgate-on-Sea; Mr. Crow, Canterbury; Mr. Creasy, Winslow; Messrs. Clarke and Co., Croydon; Dr. Chamberlayne, Stalybridge; Mr. J. H. Crocker, Eccles; Prof. Corfield, London; Mr. E. Clarke; Mr. Dilley, Huntingdon; Mr. Davis, Gateshead; Mrs. Danks, Tettenhall; Mrs. Delaforce, London; Messrs. Eason and Son, Dublin; Mr. Fox, Willenhall; Prof. Griffin, Geneva; Mr. Griffin, Saltburn; Messrs. Gastrell and Son, Cheltenham; Mr. Gardner, Roscombe; Dr. Genney, Edinburgh; Mr. Grier, Cornwall; Mr. Hargreaves, London; Dr. Heelis, Nottingham; Mr. R. P. Hardy, London; Mr. Hill, Norfolk; Canon Harford, London; Dr. Hambleton; Mr. Hankinson, Bournemouth; Dr. Harley, London; Mr. Haviland, London; Mr. Hornibrook, London; Dr. Hume, Newcastle-on-Tyne; Mr. Johnson, Teignmouth; Messrs. Jones and Son, Woodford Green; Mr. Jones, Shrewsbury; Mr. Keiffenheim, London; Dr. Lees, London; Mr. Lansdowne, Fife; Mr. Lawrence-Hamilton, London; Mr. Lamb, London; Dr. Mercier; Mr. Malcolm Morris, London; Mr. Morton, Glasgow; Surgeon-Major Murray, Calcutta; Mr. Maund, London; Dr. Manson, London; Dr. Macgregor, Dunedin; Mr. F. W. Mann, Leeds; Mr. Marsh, Bradford; Mr. Nelson, Warwick; Mr. Owen, London; Mr. Orchard, London; Major Pead, Dulwich; Mr. Pratt, Somerset; Mr. Page, London; Prof. Pacchiotti, London; Mr. Place, Exmouth; Mr. Powley, Whitton; Dr. R. Pringle, Blackheath; Dr. Poole, Poulton; Dr. Portee, Helmsley; Dr. Raye, Whitburn; Dr. A. H. Rideal, Southborough; Messrs. Robertson and Scott, Edinburgh; Dr. Railton, Manchester; Messrs. W. H. Smith and Son, London; Dr. R. Savage, London; Mr. Skrimshire, Blaenavon; Mr. C. H. Sers, London; Mr. P. W. Squire, London; Mr. Sealy, Weybridge; Mr. Startin, London; Dr. Skerritt, Bristol; Mr. Scriven, London; Dr. Saunders, London; Dr. S. Stephenson; Dr. Shepherd, Lincoln; Dr. Taylor, Jahnstone; Mr Tabberer, London; Mr. Lawson Tait, Birmingham; Mr. B. Thornton, Margate; Mr. Vigno, London; Mr. Wylie, Belfast; Mr. Wand, Leicester; Messrs. Wright, Dain, and Co., Birmingham; Mr. R. Williams, Holyhead; Mr. Wiskin, Herne Hill; Dr. Waterhouse, Hampstead; Dr. Warner, London; Dr. Tucker Wise, Davos; Mr. Wright, Ampthill; Dr. Wilks; Mr. Watson, Glasgow; Mr. A. Woakes, Margate; Dr. Whith, Carliale; A Subscriber for Twenty Years; J. H. P., Southend-on-Sea; Secretary, Durham County Asylum; General Infirmary, Gloucester; Secretary, Central London Ophthalmic Hospital; Executor, Tenby; Secretary, Royal Albert Hospital, Devonport; M.D., F.R.C.P. Edin.; M., Liverpool; Trebly Qualified; E. F. B., London; Royal Infirmary, Manchester; Johannis Springs Co., London; Alpha, Swansea; D. L. D., London; Gamma, London; F. F., London; J. H. P. G.; Practitioner.

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